Bug and other critter diseases that sometimes make Iowan's sick….

Center for Acute Disease Epidemiology
Iowa Department of Public Health
Wednesday, September 17, 2013

Discuss Diseases by Critter

- Mosquito Diseases
- Tick Diseases
- Rodent Diseases
- Bat Diseases

How many different types of mosquitoes have been identified in Iowa?

- <10 species
- About 50 species
- Over 100 species

- The answer is……
- 55 different species

  - Been around for >150 million years
  - Over 3,500 species worldwide
  - Some are good giving us diseases and some aren't

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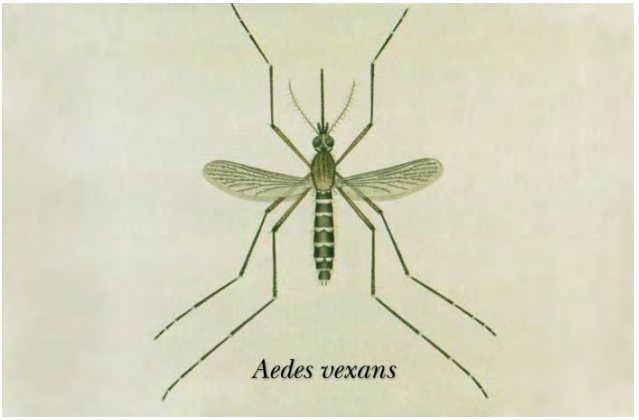
Aedes Mosquitoes

- **Most species are poor disease vectors**
  - **Floodwater mosquitoes**



- **Exceptions:**
  - ***Aedes japonicus***
    - **First found 7 years ago**
    - **Likely competent vector of several viruses**
  - ***Aedes aegypti & Aedes albopictus***
    - **Not in IA, in Southern US (*Aedes albopictus* has been identified 4 times)**
    - **Dengue Virus**
  - ***Aedes triseriatus***
    - **LaCrosse Enchephalitis**

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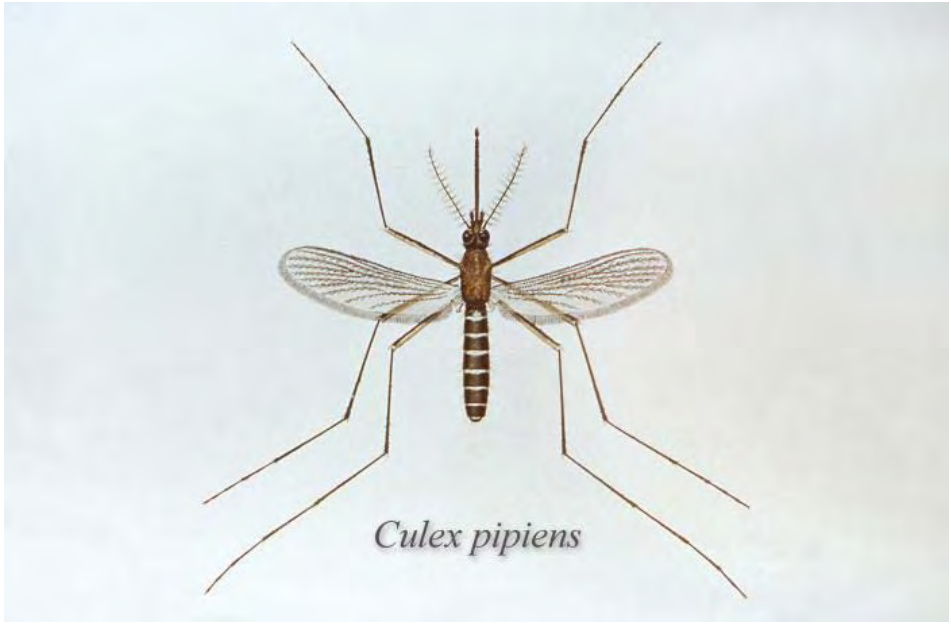
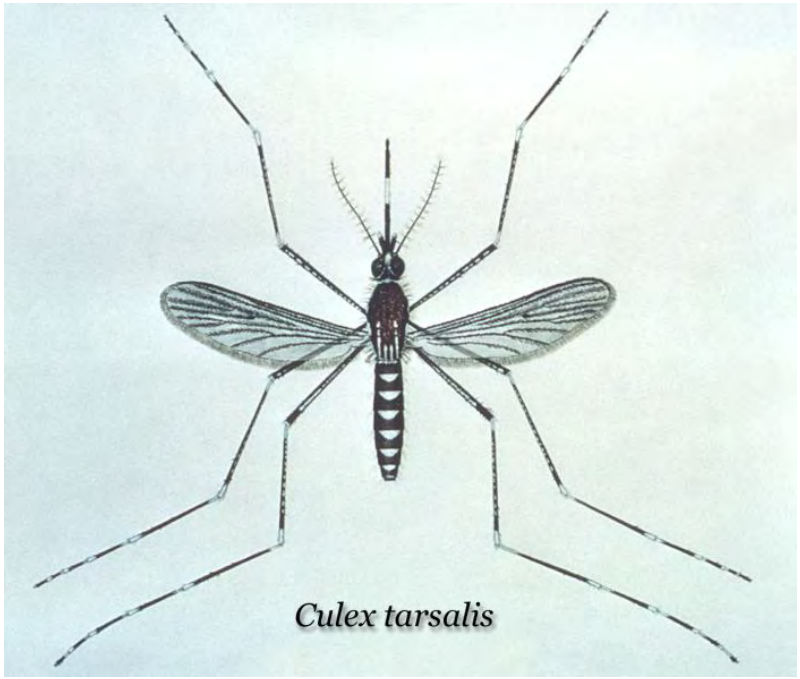
Culex Mosquitoes





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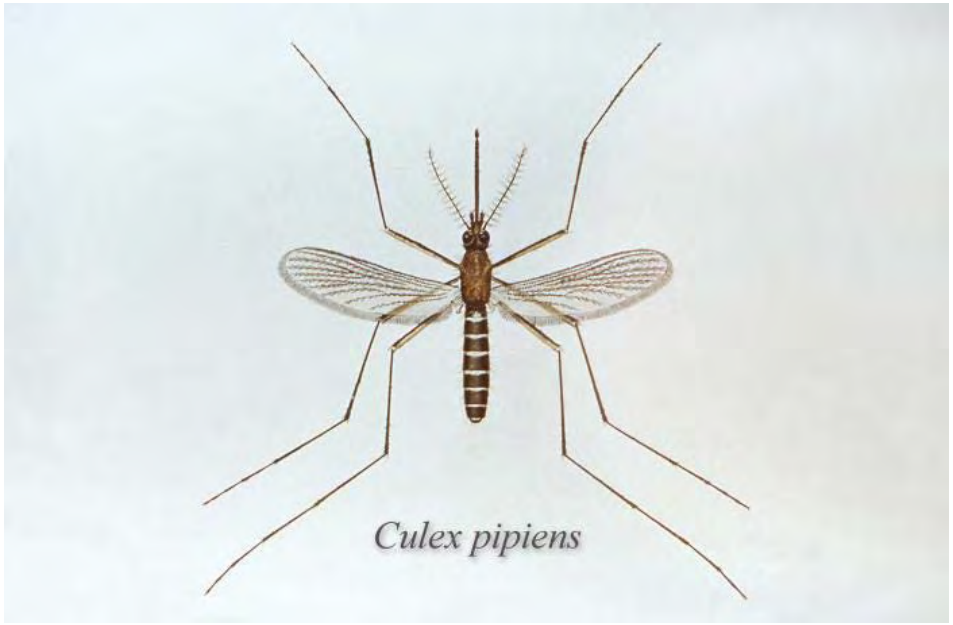
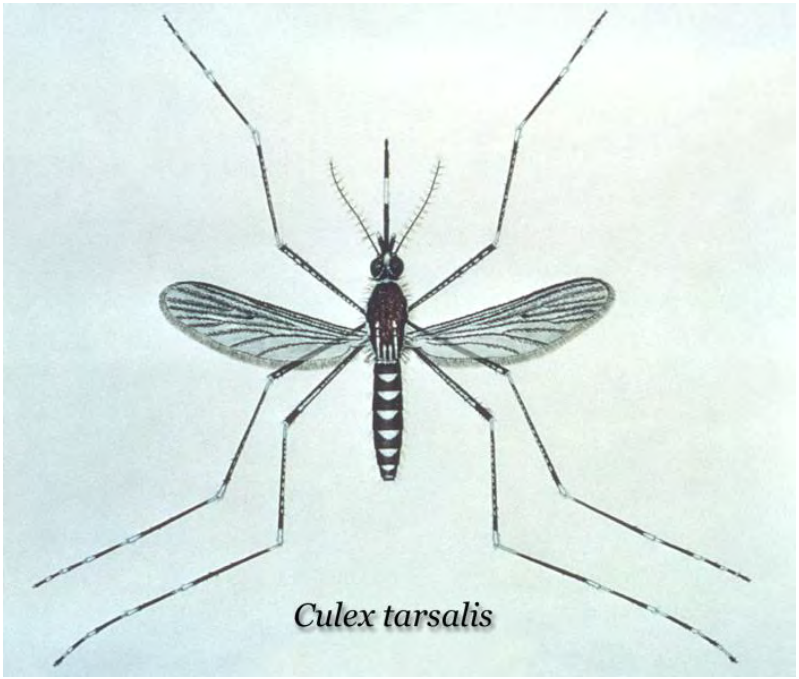
Culex Mosquitoes

Good at giving us diseases-
primary WNV vectors in Iowa





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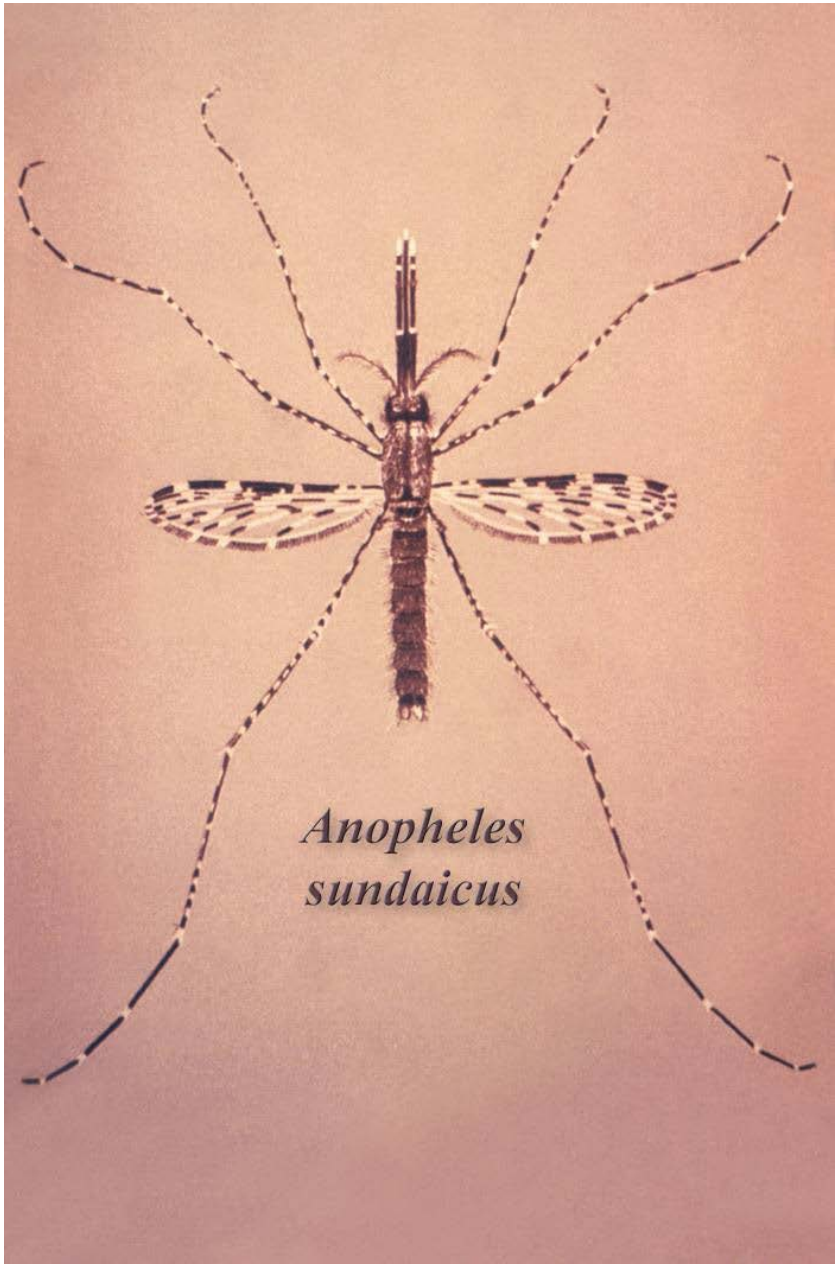
Anopheles

- Also big mosquitoes
- Bite hard
- Not efficient disease transmitters in Iowa
- Vector for Malaria



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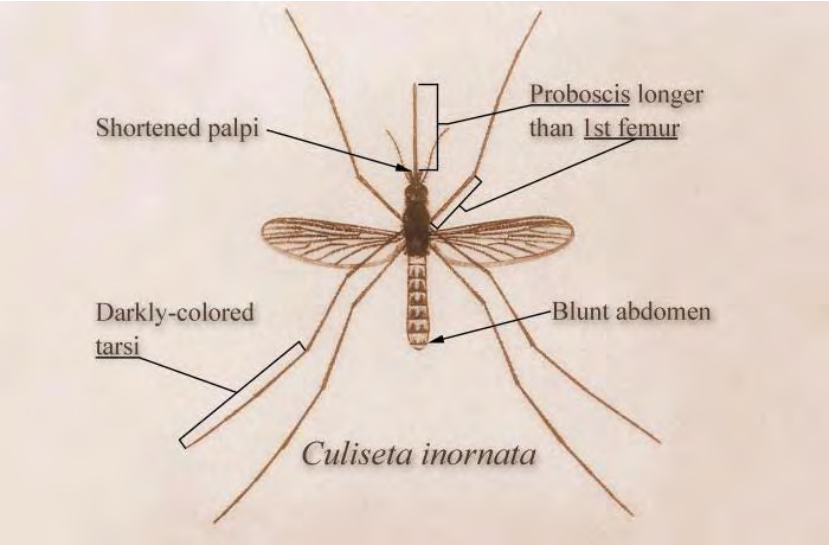
Culiseta Mosquitoes

- Big in size
- Aggressive biters
- Primarily feeds on birds
- Not good disease transmitters



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What year was West Nile virus first found in Iowa?

- 1999
- 2000
- 2001

- WNV was first identified in a crow in Scott County in 2001

West Nile virus

- First isolated from a febrile adult woman in the West Nile District of Uganda in 1937
- Recognized as a cause of severe human meningitis or encephalitis in elderly patients in the 1950's
- Equine disease was first noted in Egypt and France in the early 1960's

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West Nile virus in US

- First appeared in US
  - Dead crows and wild birds in June
  - First human cases of encephalitis in early August
  - Late August equine encephalitis outbreak in Long Island
- Preliminary human diagnosis was St. Louis Encephalitis virus
  - Analysis of tissues from wild crows and several exotic birds that had died at the Bronx Zoo in September revealed West Nile virus
  - Human and equine cases re-evaluated and confirmed as WNV

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West Nile Virus

- **Symptoms:**
  - 80% No symptoms
  - Nearly 20% mild flu-like symptoms
  - 1 in 150 severe life threatening illness-encephalitis

- **At risk for infection:**
  - Anyone outside without protection

- **At risk for severe illness:**
  - Persons over 50 years of age
  - Immune compromised

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1999 West Nile Activity

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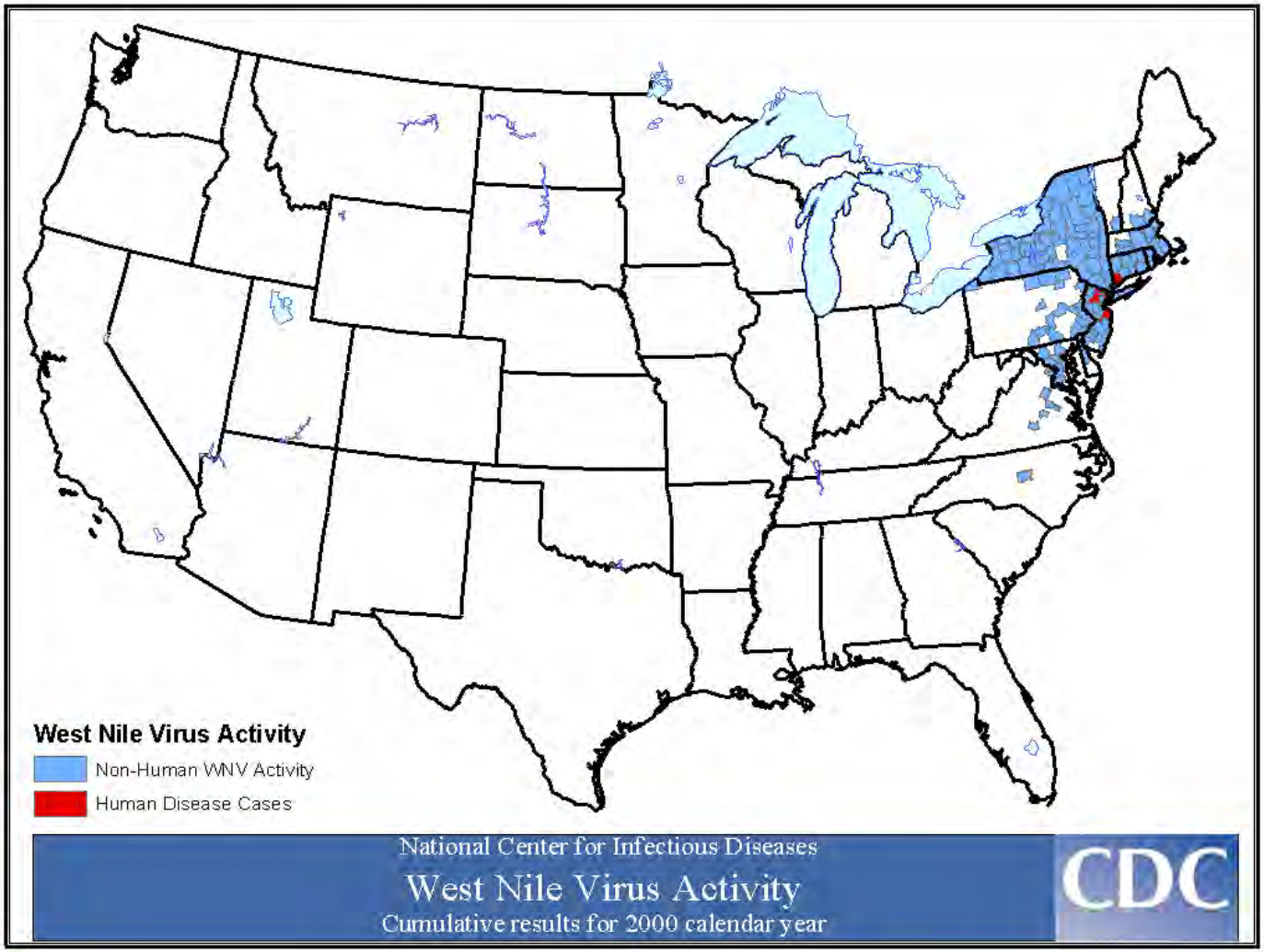
2000 West Nile Activity



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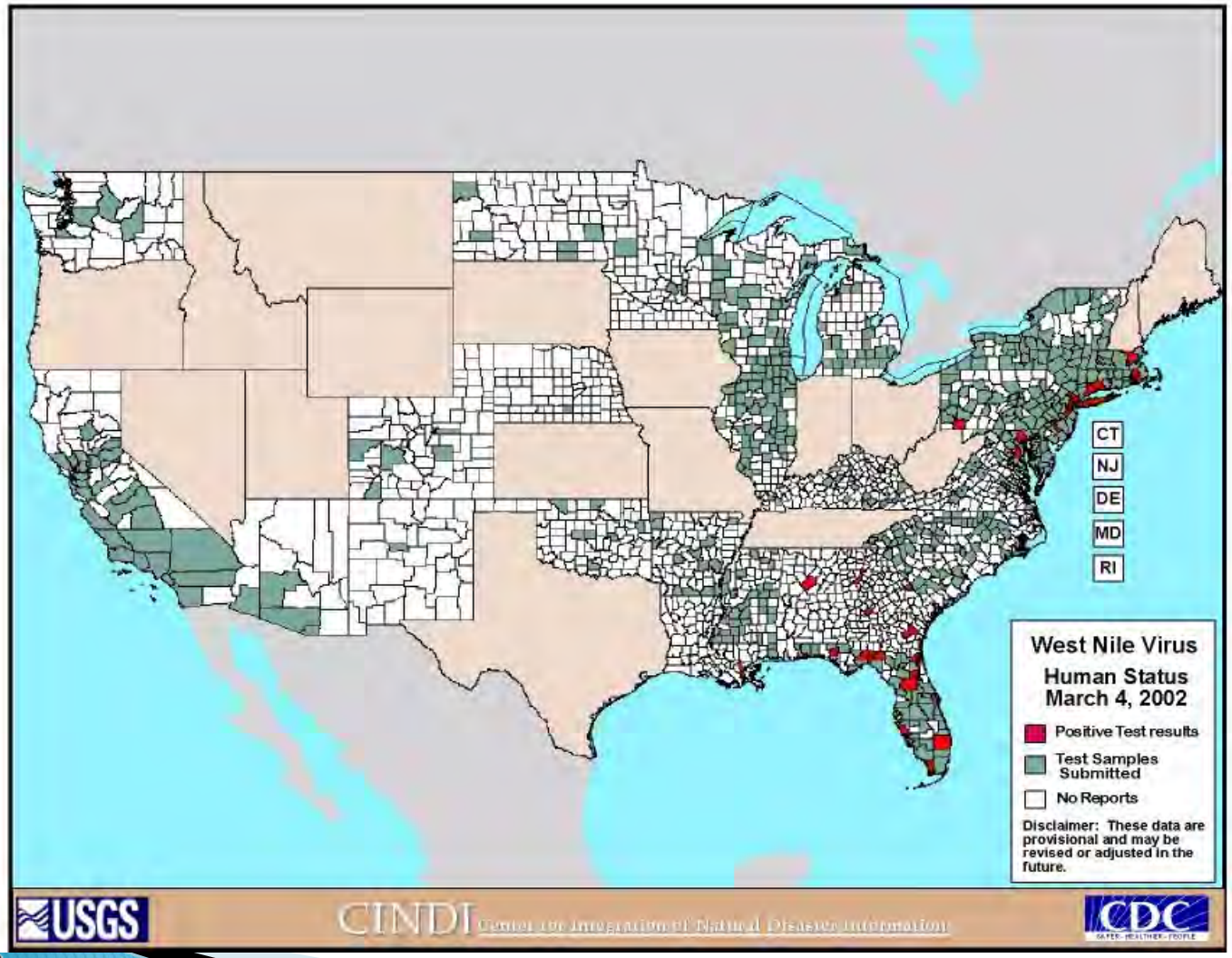
2001 West Nile Activity



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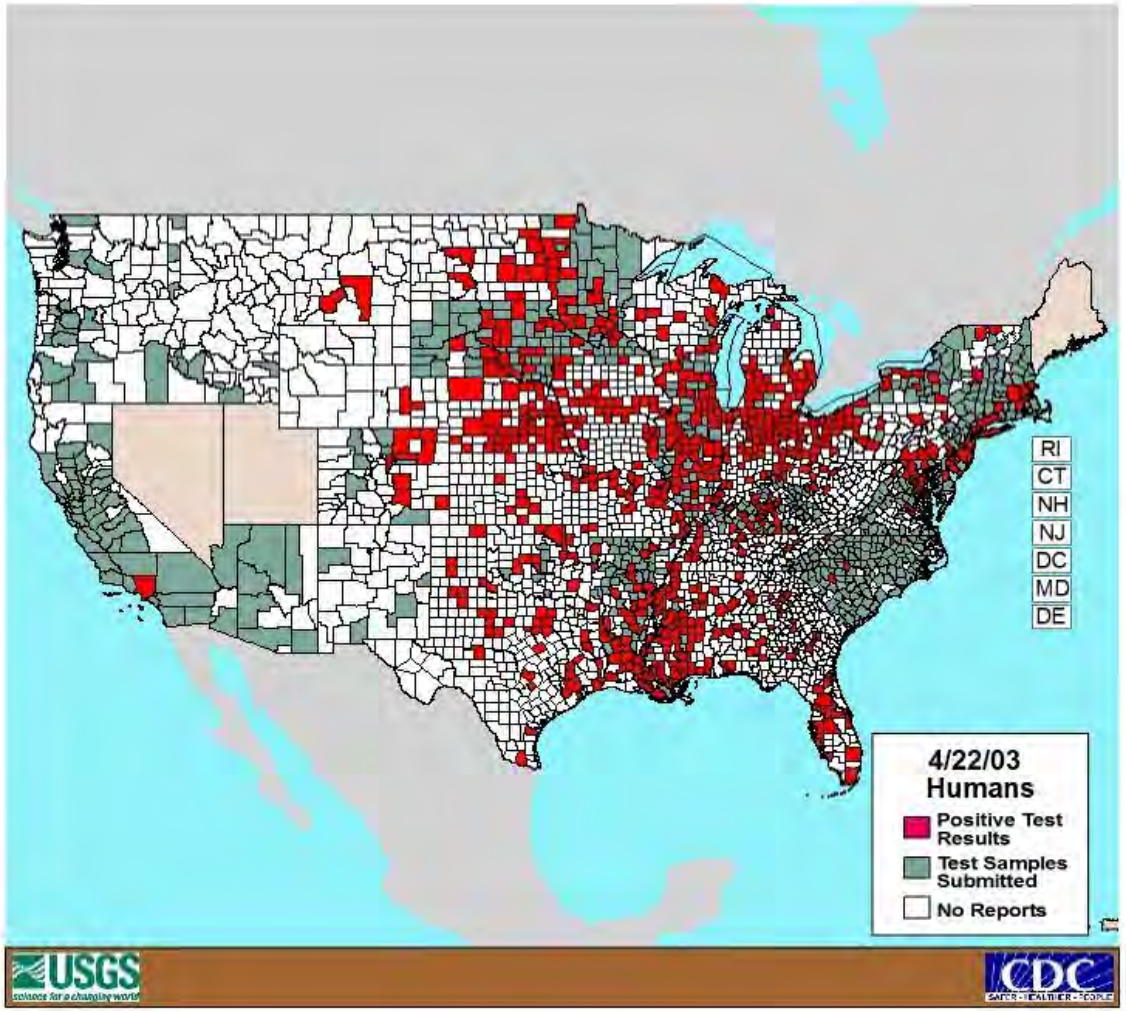
2002 West Nile Activity



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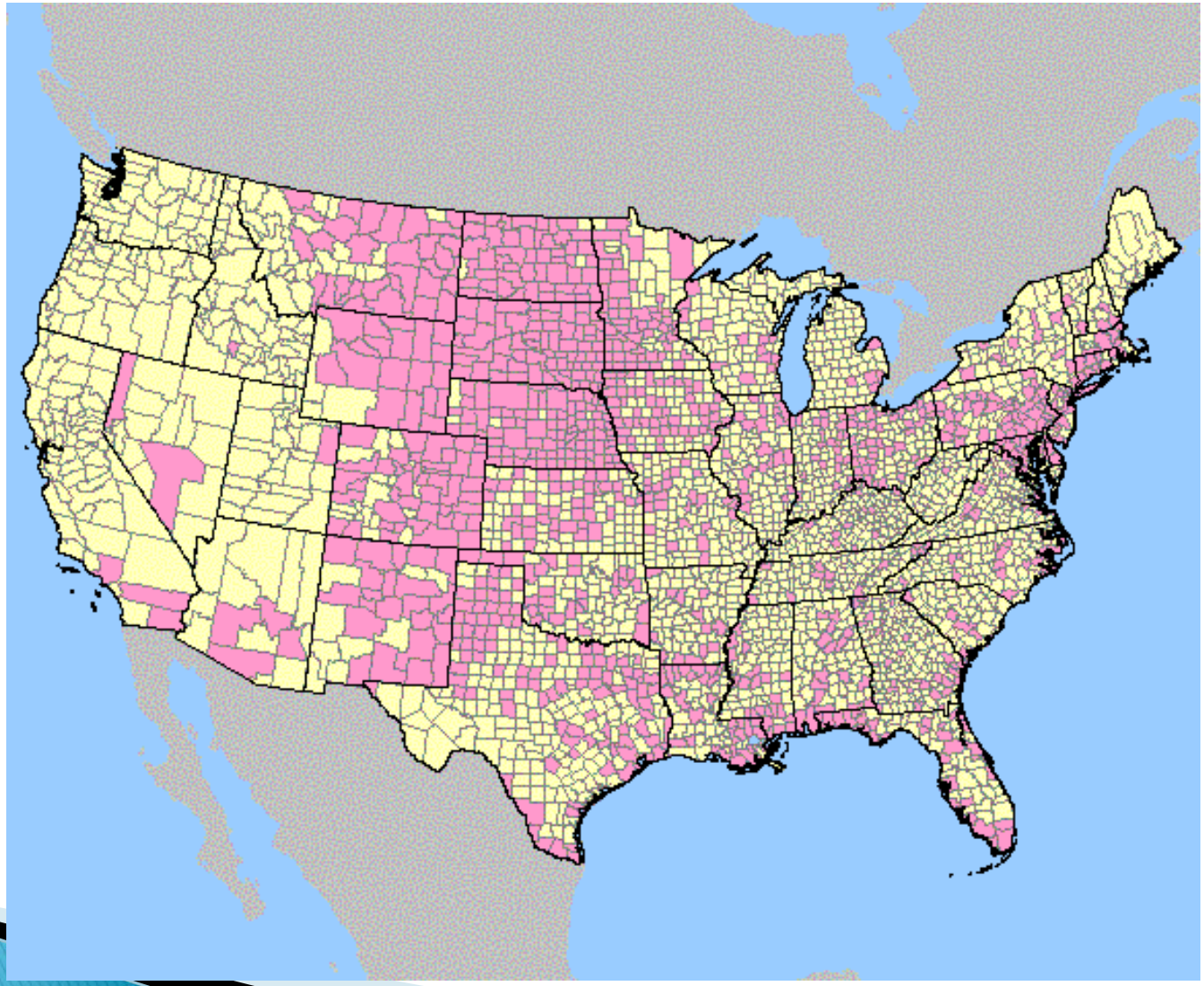
2003 West Nile Activity



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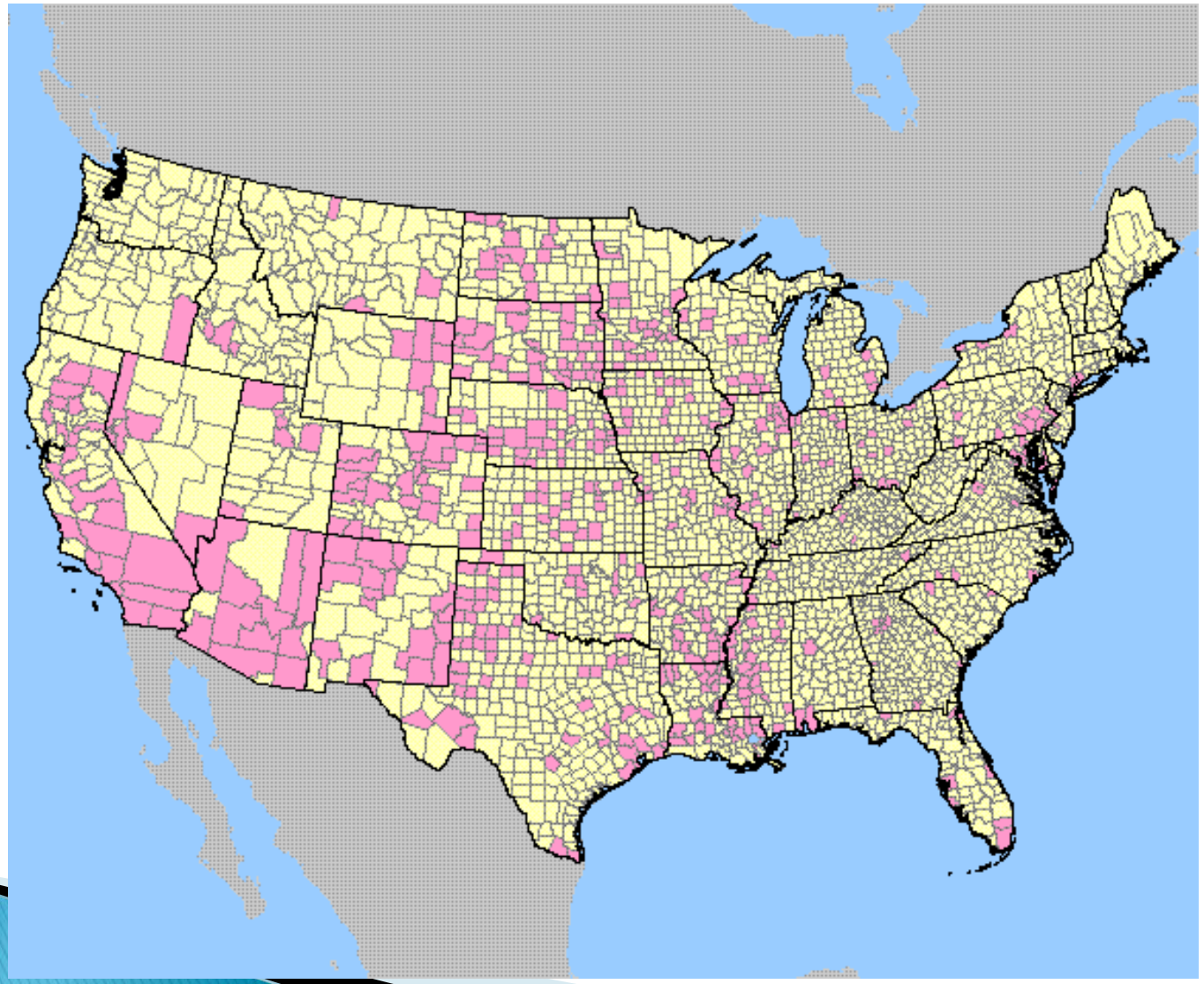
2004 West Nile Activity



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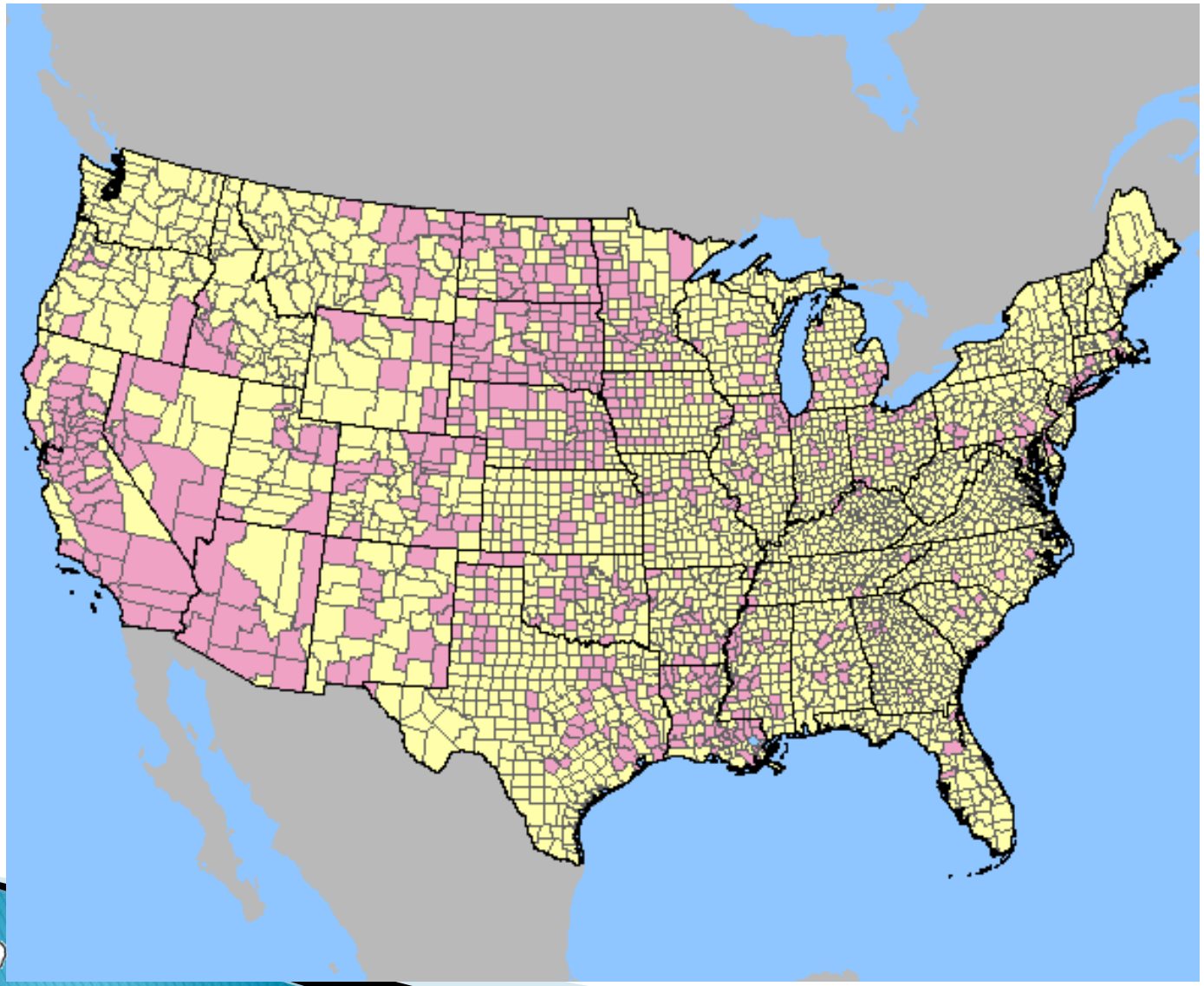
2005 West Nile Activity



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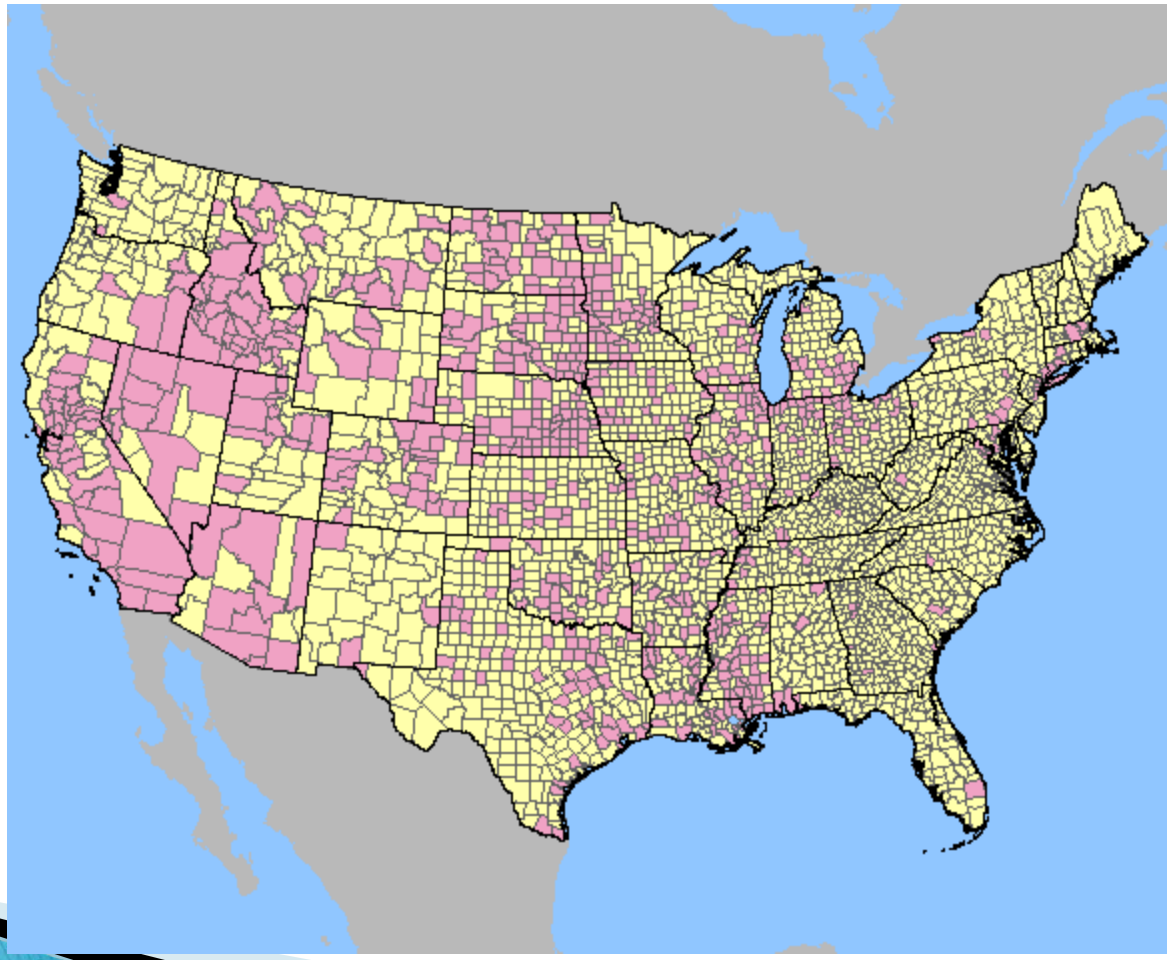
2006 West Nile Activity



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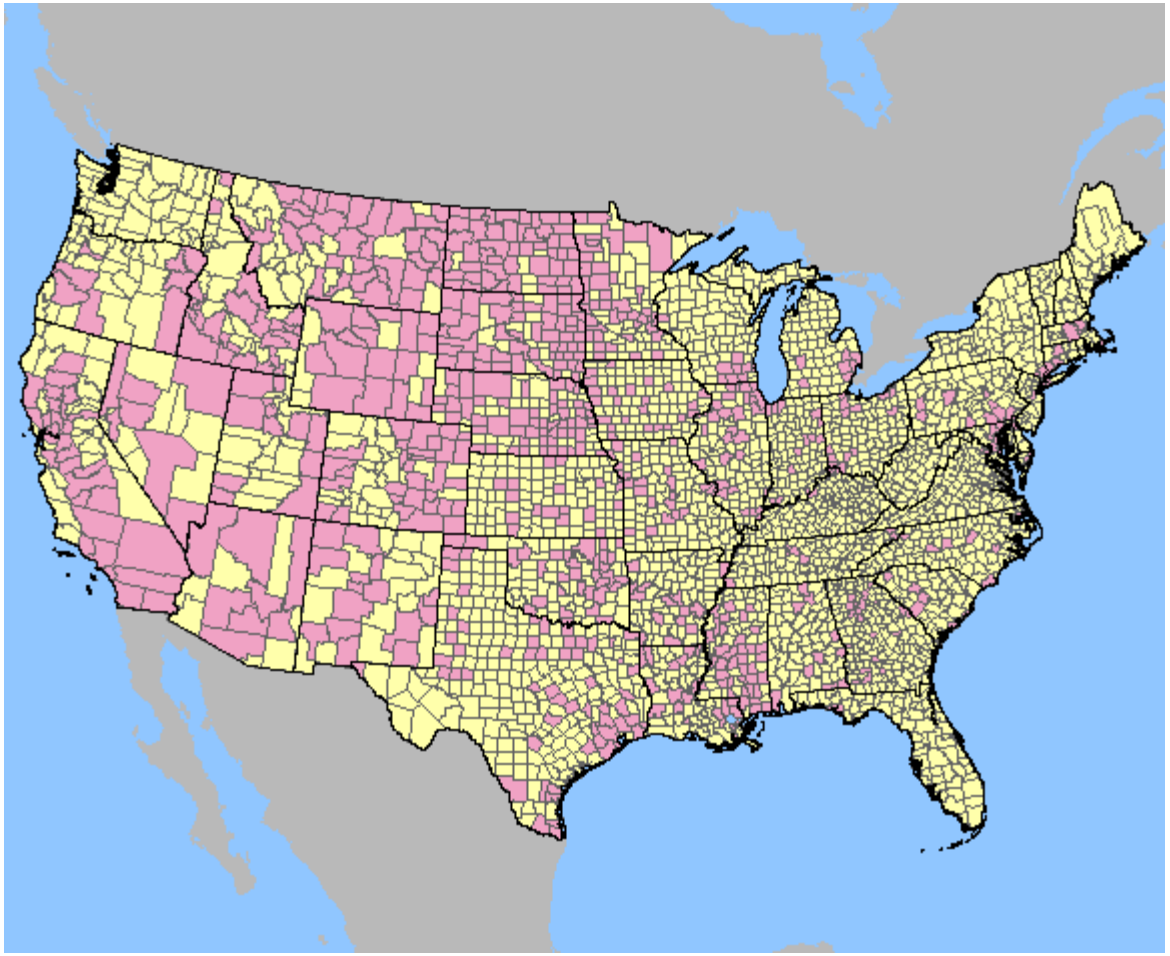
2007 West Nile Activity



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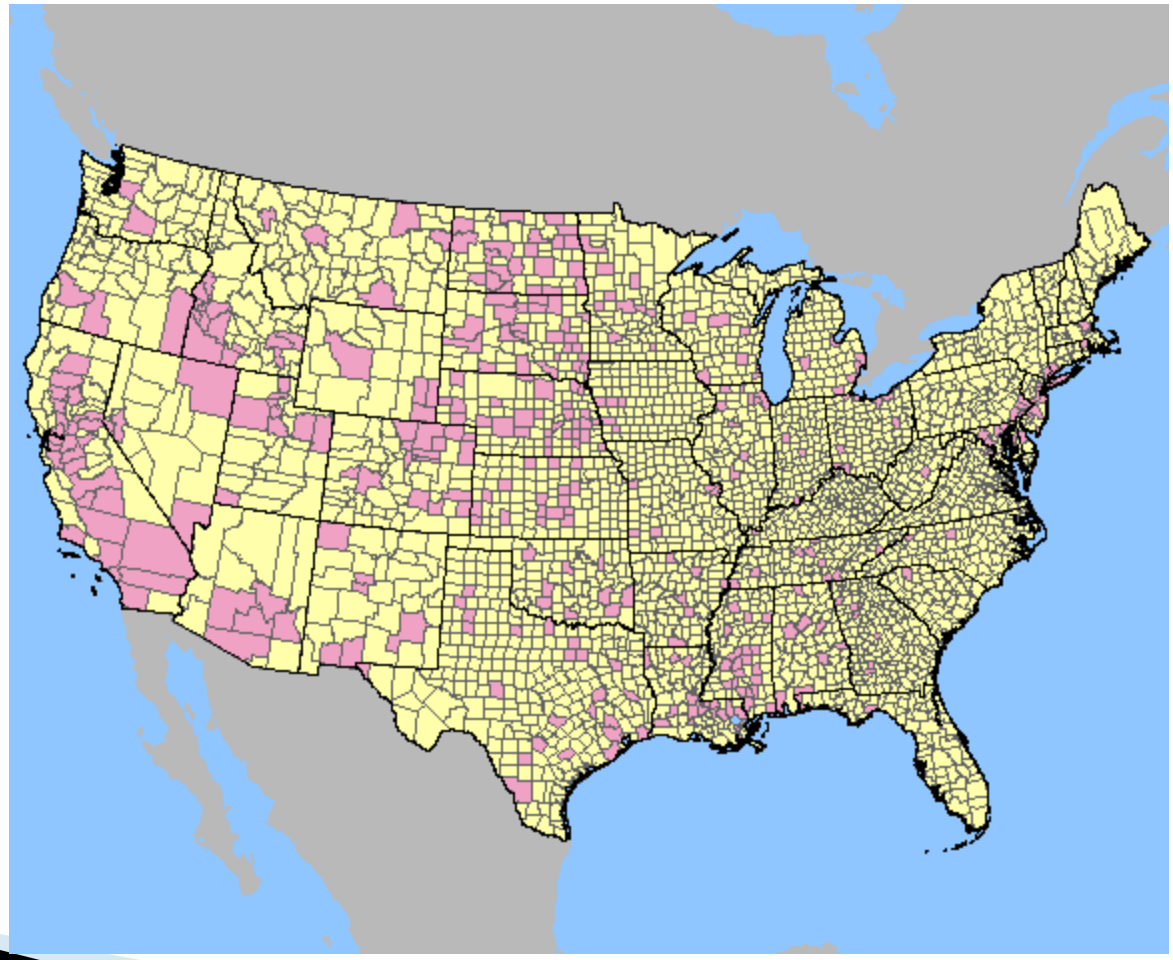
2008 West Nile Activity



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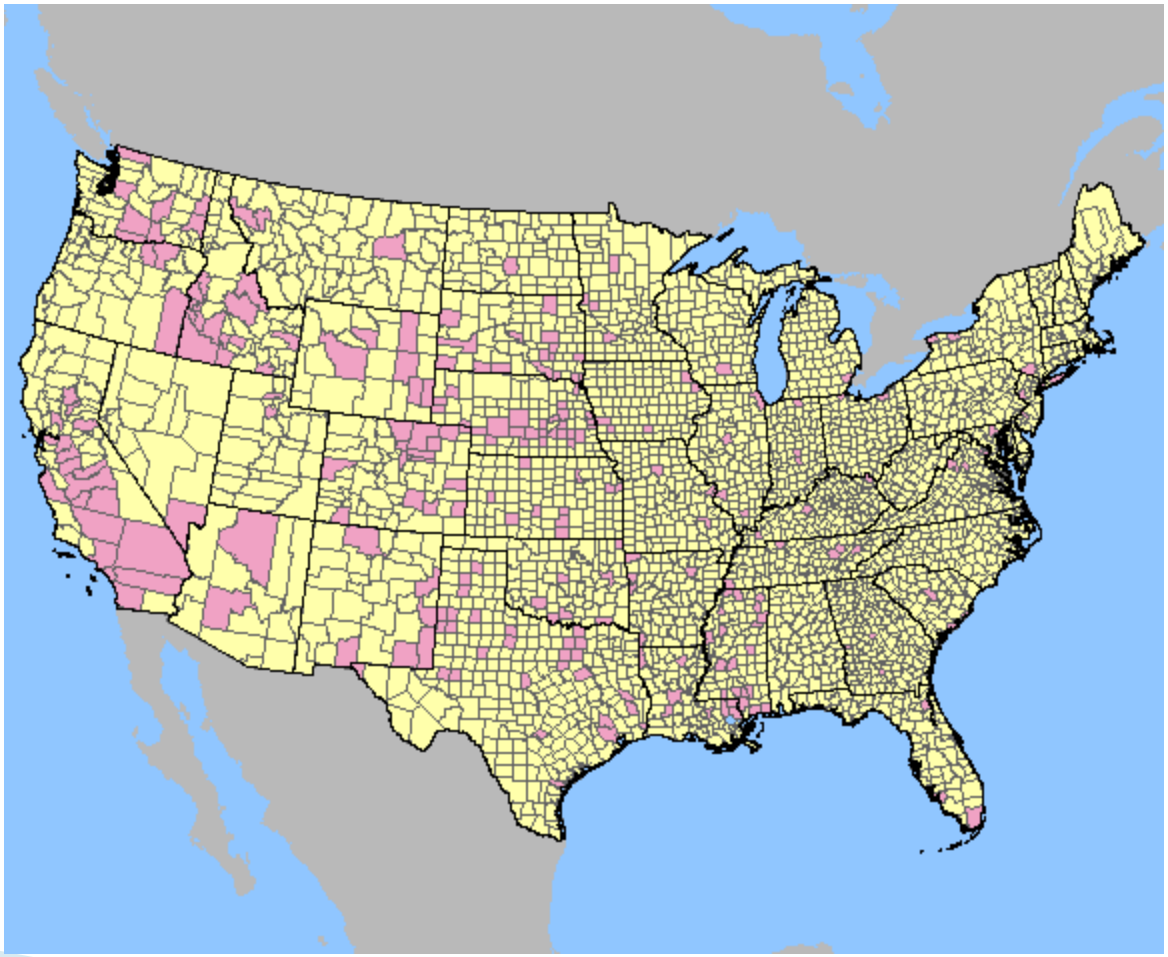
2009 West Nile Activity



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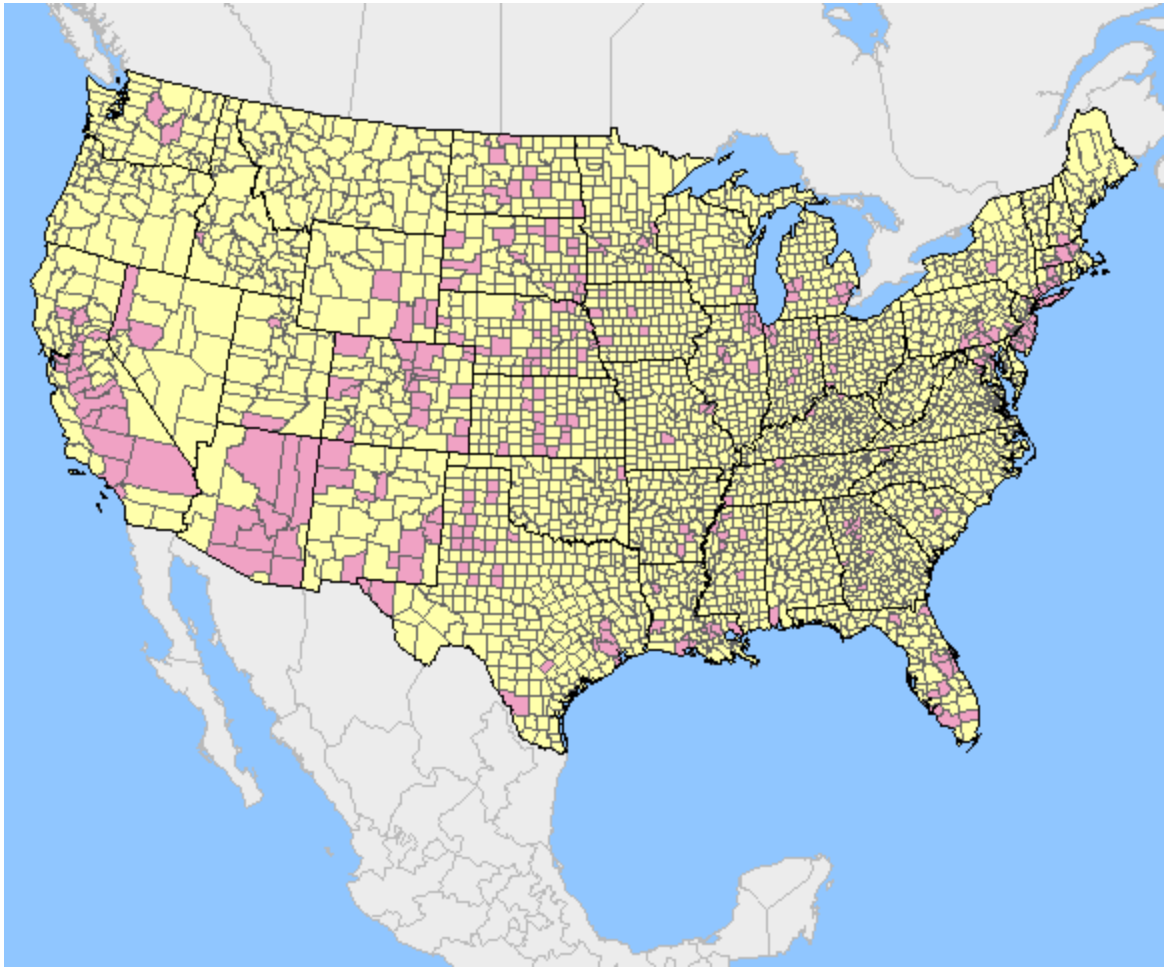
2010 West Nile Activity



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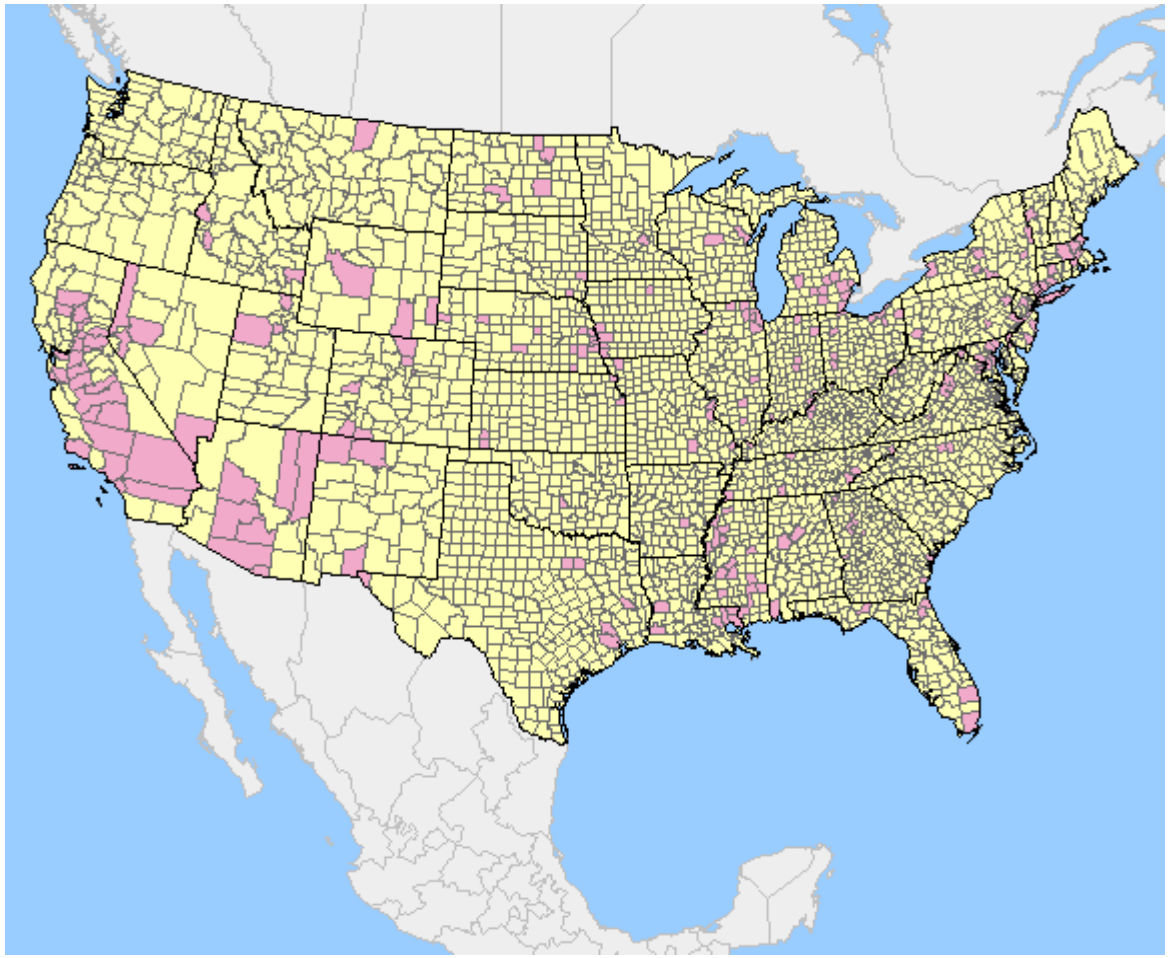
2011 West Nile Activity



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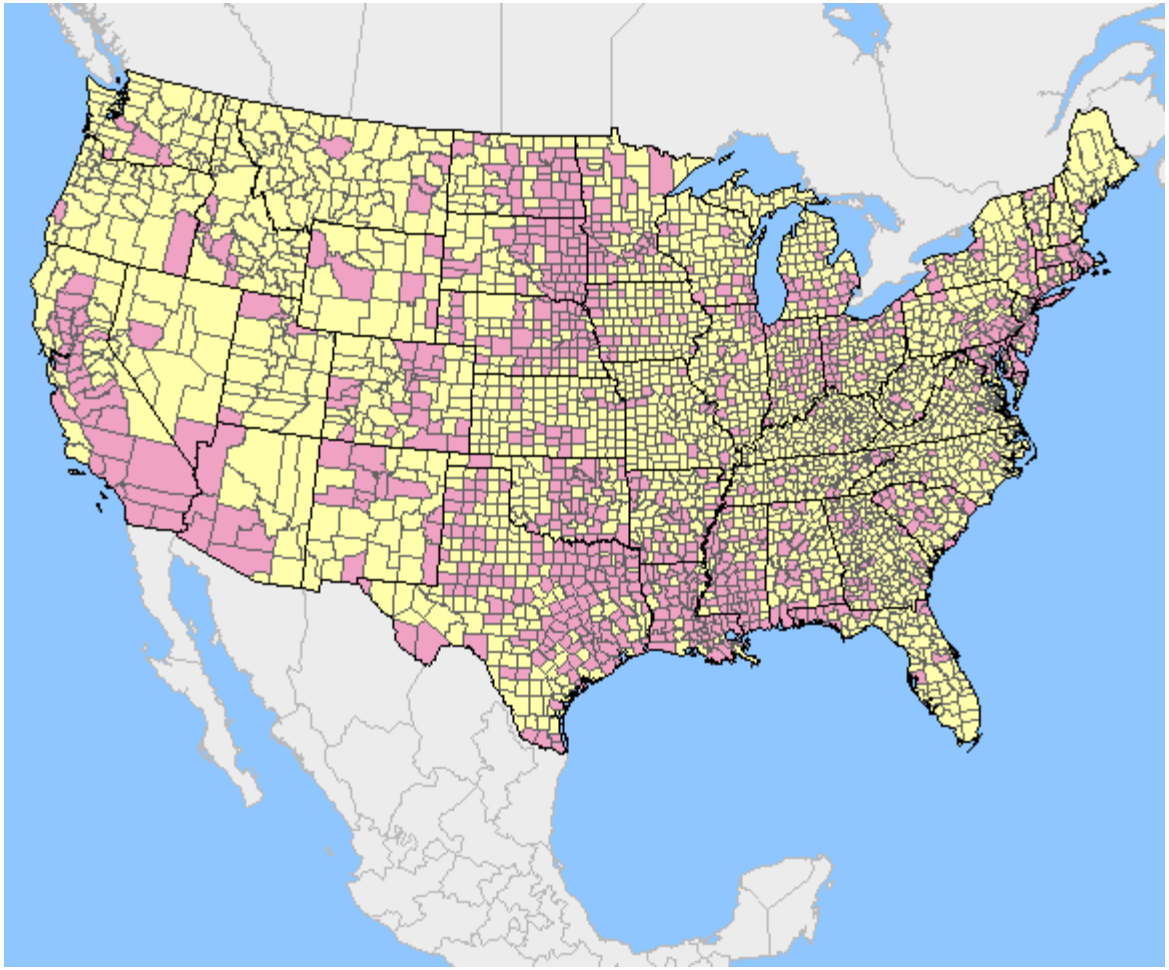
2012 West Nile Activity



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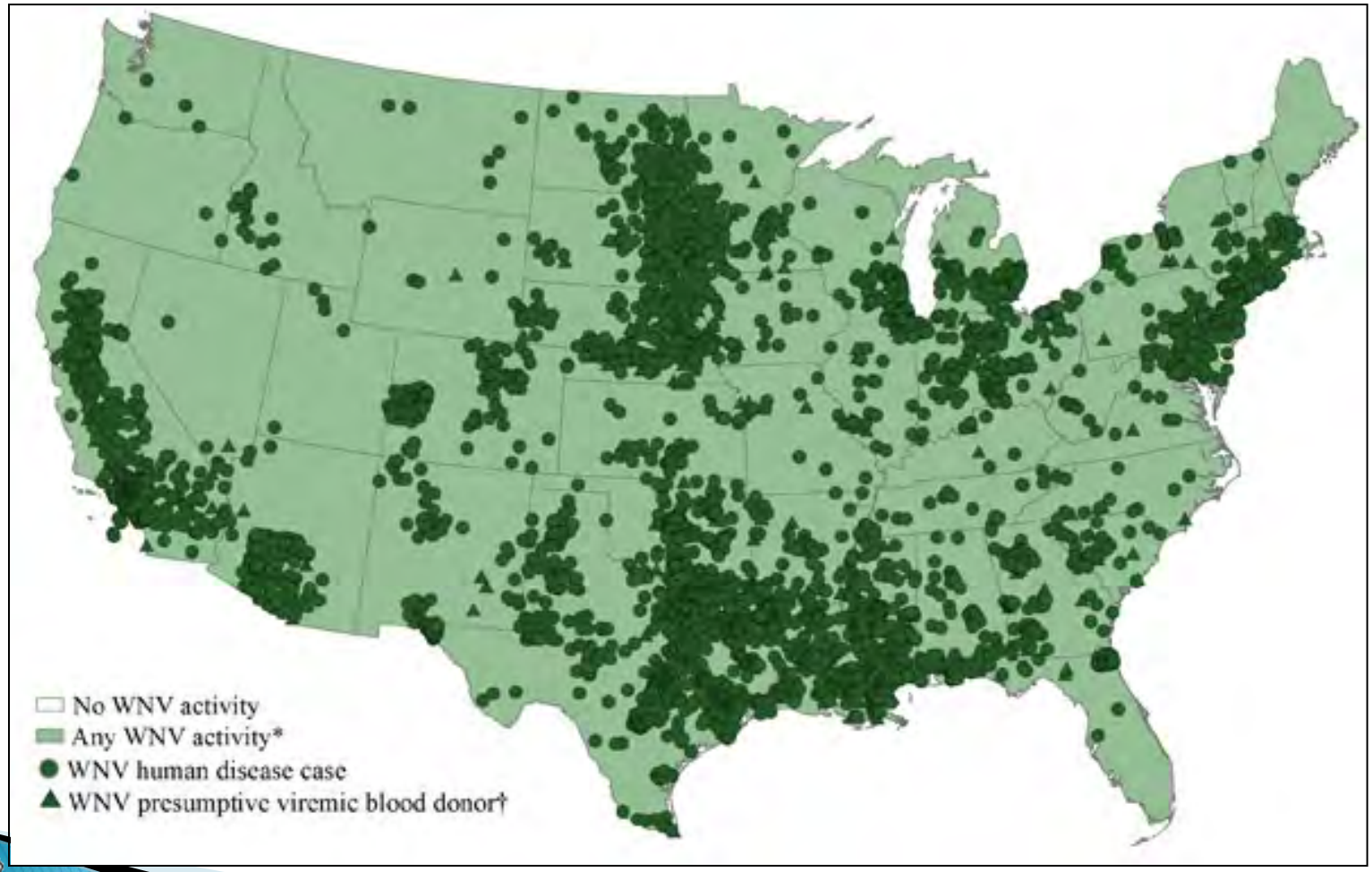
West Nile Activity in the U.S in 2012



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West Nile Virus Activity in Iowa in 2012

- 31 human cases
  - No reported deaths
  - 9 cases reported last year
- 6 positive blood donors
- 35 horses
- 14 mosquito pools
- 17 sentinel chickens

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Source: http://www.accessscience.com/search.aspx?rootID=798319

West Nile Virus Activity in Iowa in 2013

- 26 human cases and additional cases are being investigated
- 9 positive blood donors
- 9 sentinel chickens
- 30 mosquito pools
- 5 horses

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West Nile Resources

Center for Acute Disease Epidemiology | Acute Disease Prevention and Emergency Response | West Nile Virus Website

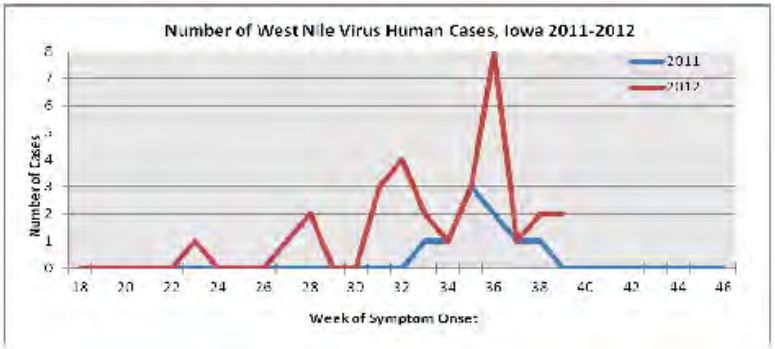
Date Issued: October 29, 2012

Overview:

Thirty cases of West Nile Virus have been reported in Iowa in 2012 and additional cases are being investigated. Six positive blood donors have been reported so far this year. Thirty-three horses have also tested positive for the virus. Fourteen mosquito pools and seventeen sentinel chickens have tested positive for West Nile virus thus far. In 2011, there were 9 human cases of West Nile Virus, and 2 deaths resulting from the disease.

Human / Blood Donor / Sentinel Chicken / Mosquito Surveillance, 2012 Positive Samples

				Mosquito Pools		
County	Human	Blood Donor	Sentinel Chickens	*Culex pipiens*	*Culex erraticus*	*Culex tarsalis*
Black Hawk	0	0	N/A	0	0	0
Boone	1	0	N/A	N/A	N/A	N/A
Cass	1	1	N/A	N/A	N/A	N/A
Cherokee	1	0	N/A	N/A	N/A	N/A
Des Moines	1	0	N/A	N/A	N/A	N/A
Dickinson	1	0	N/A	N/A	N/A	N/A
Floyd	1	0	N/A	N/A	N/A	N/A
Fremont	1	0	N/A	N/A	N/A	N/A
Grundy	1	0	N/A	N/A	N/A	N/A
Harrison	1	1	N/A	N/A	N/A	N/A
Linn	1	0	N/A	N/A	N/A	N/A
Lyon	3	0	N/A	N/A	N/A	N/A
Madison	1	0	N/A	N/A	N/A	N/A
Marion	1	0	N/A	N/A	N/A	N/A
Montgomery	1	0	N/A	N/A	N/A	N/A
Page	2	0	N/A	N/A	N/A	N/A
Palo Alto	1	0	N/A	N/A	N/A	N/A
Plymouth	2	1	N/A	N/A	N/A	N/A
Polk	1	0	0	5	0	0
Pottawattamie	2	0	1	0	0	0
Scott	0	0	5	0	0	0
Sioux	1	0	N/A	N/A	N/A	N/A
Story	0	0	5	5	0	0
Tama	2	0	N/A	N/A	N/A	N/A
Winnebago	0	1	N/A	N/A	N/A	N/A
Woodbury	3	2	6	3	1	0
Total	*30*	*6*	*17*	*13*	*1*	*0*



FACT SHEET **Mosquito Repellents**

Avoid mosquito bites by:
- Applying approved insect repellents (listed below).
- Wearing protective clothing, such as long sleeves, long pants, socks and shoes.
- Being aware of peak hours of mosquito activity: dusk and dawn.

CDC Approved/EPA Registered Mosquito Repellents:
1. **DEET**
   - The American Academy of Pediatrics recommends that repellents with DEET should not be used on infants less than 2 months old.
   - Repellents that contain up to 30 percent DEET are safe for children.
   - Refer to the IDPH DEET fact sheet for more information.
2. **Picaridin**
3. **Oil of Lemon Eucalyptus or PMD**
   - Should not to be used on children under the age of three years.
4. **IR3535**
5. **Permethrin**
   - Only recommended for use on clothing, shoes, bed nets, and camping gear. Permethrin should not be applied directly on skin.

Mosquito proof your home by:
- Emptying water from flower pots, pet food and water dishes, birdbaths, swimming pool covers, buckets, barrels, and cans. This should be done at least once or twice weekly.
- Checking for clogged rain gutters and cleaning them out.
- Removing discarded tires and other items that could collect water.
- Checking for containers or trash in places that may be hard to see, such as under bushes or under your home.

How often should mosquito repellent be applied?
The label directions on the repellent should always be followed. Length of protection against mosquito bites varies with the amount of the active ingredient, environmental factors such as temperature and humidity, amount of physical activity/perspiration, water exposure, and other factors.

What precautions should be followed when using insect repellents?
- Read and carefully follow product label directions and precautions.
- Apply repellent sparingly on exposed skin and/or clothing.
- Do not apply repellent near eyes, lips, or mouth.
- Never apply repellents over cuts, wounds, or irritated skin.
- Avoid using sprays in enclosed areas.
- Do not use repellents near food.
- Do not apply repellent to the hands of young children.
- Do not allow young children to apply repellent to themselves.
- After returning indoors, wash treated skin with soap and warm water.
- Avoid over application. Heavy application is not necessary to achieve protection.
- Wash treated clothing before wearing again.

Can mosquito repellents be used with sunscreen?
Yes. People can, and should, use both a sunscreen and an insect repellent when they are outdoors. Follow the instructions on the package for proper application of each product. In general, the recommendation is to apply sunscreen first, followed by repellent.

FAQ - Use of Mosquito Repellent on Children

Can insect repellents be used on children?
- Repellent products must state any age restriction. If there is none, the US Environmental Protection Agency (EPA) has not required a restriction on the use of the product.
  - For example according to the label, picaridin and oil of lemon eucalyptus products should NOT be used on CHILDREN UNDER 3 YEARS.
- The American Academy of Pediatrics (AAP) recommends that repellents with DEET should not be used on infants less than 2 months old.

How should repellent be applied on children?
- Always follow the recommendations on the product label.
- Do not allow young children to apply insect repellent themselves; have an adult do it for them.
- When using repellent on a child, apply it to your own hands and then rub them on your child.
- Avoid children's eyes and mouth and use it sparingly around their ears. Do not apply repellent to children's hands. (Children may put their hands in their mouths.)
- Use enough repellent to cover exposed skin or clothing. Don't apply repellent to skin that is under clothing. Heavy application is not necessary to achieve protection.
- Do not apply repellent to cuts, wounds, or irritated skin.
- Do not spray aerosol or pump products in enclosed areas or around food.
- Keep repellents out of reach of children.
- After returning indoors, wash treated skin with soap and water.
- If repellent is applied to clothing, wash treated clothing before wearing again. Check label

West Nile Virus Prevention Messages

- Use insect repellent
- Avoid outdoor activities at dusk and dawn when mosquitoes are most active.
- Wear long-sleeved shirts, pants, shoes, and socks whenever possible outdoors.
- Eliminate standing water around the home because that's where mosquitoes lay eggs.
  - Empty water from buckets, cans, pool covers and pet water dishes.
  - Change water in bird baths every three to four days.

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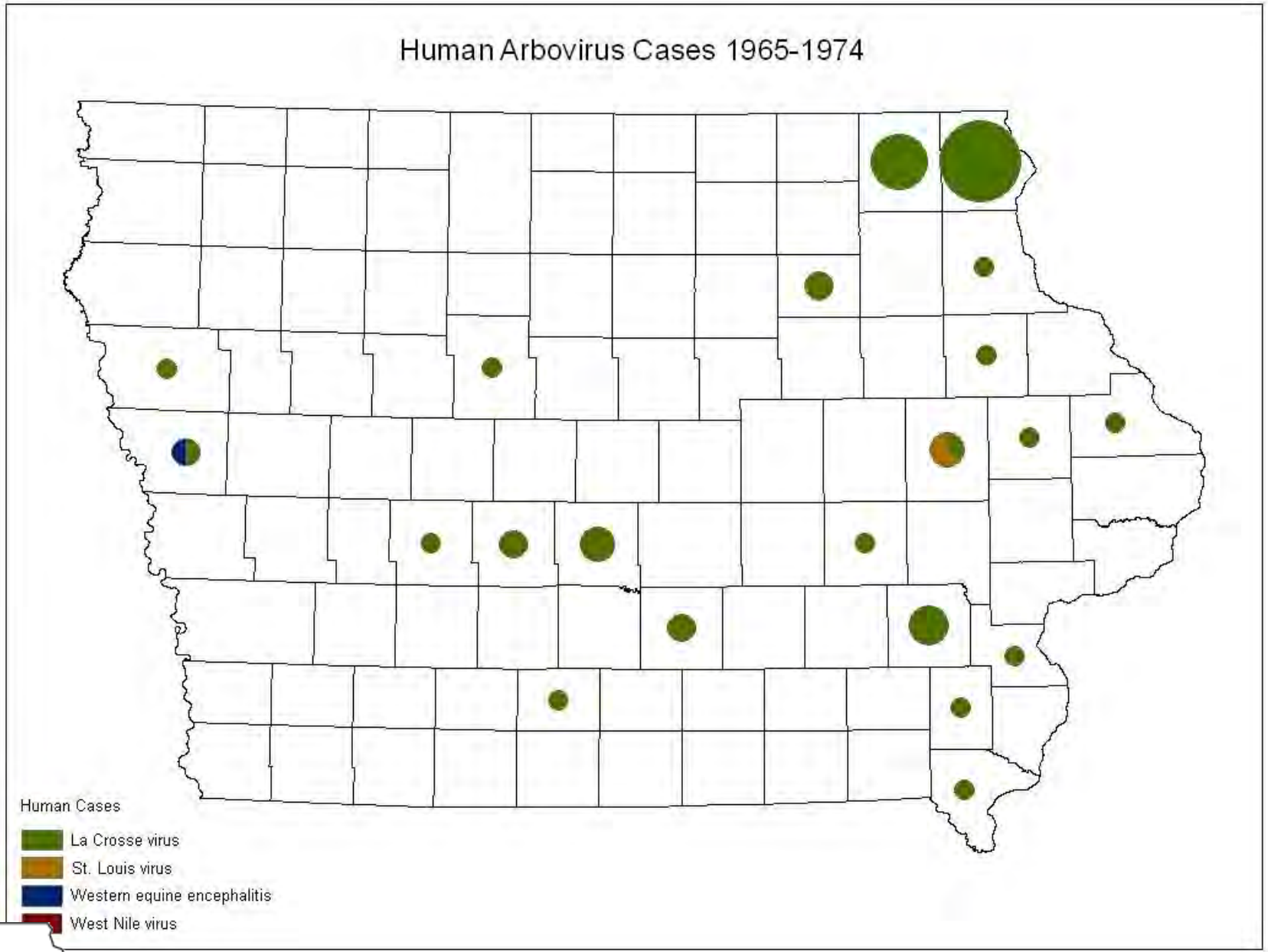
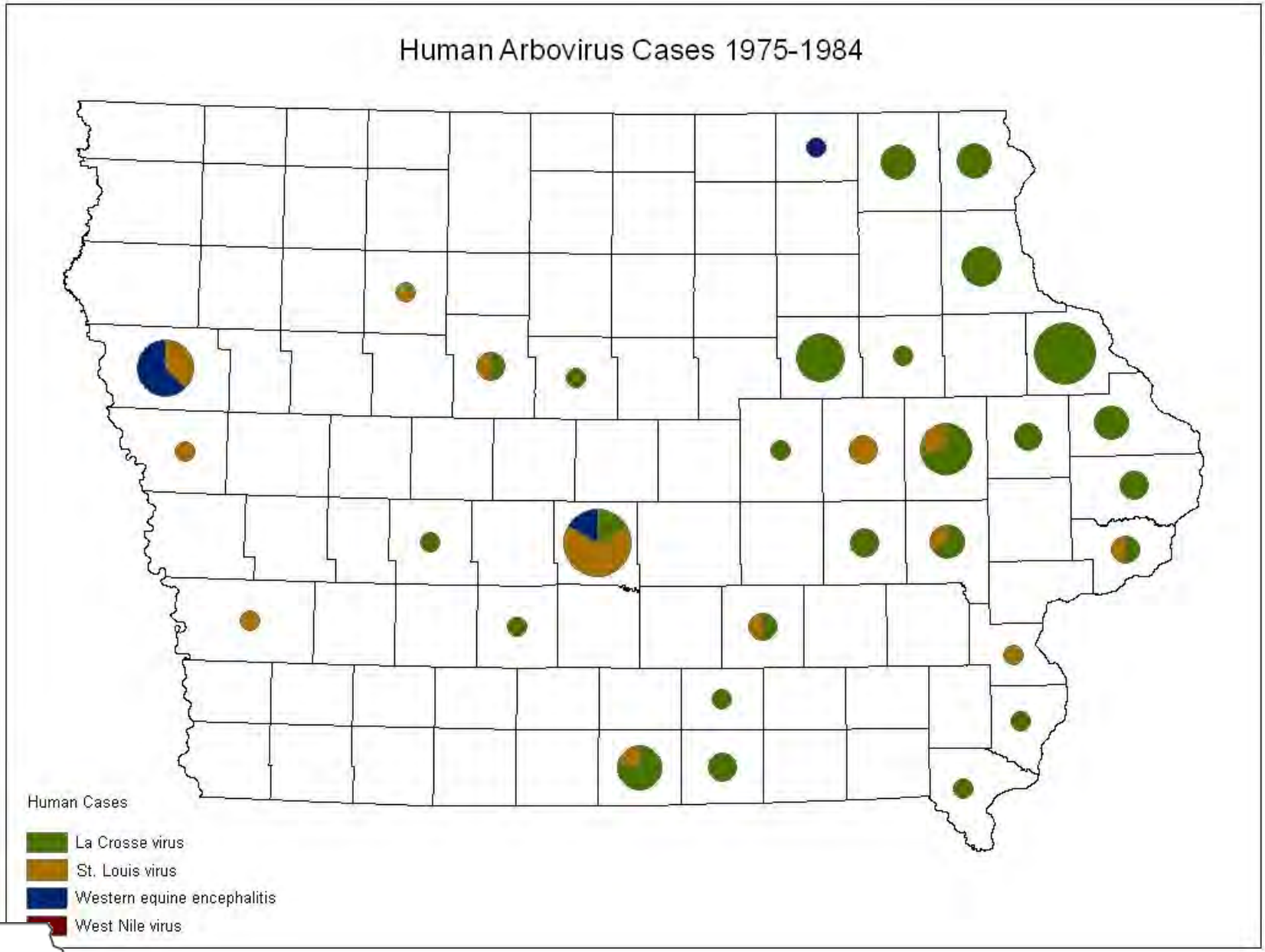
Before West Nile Virus was established in Iowa…..

- **What mosquito-borne virus was most commonly identified in our state?**
  - **La Crosse Encephalitis**

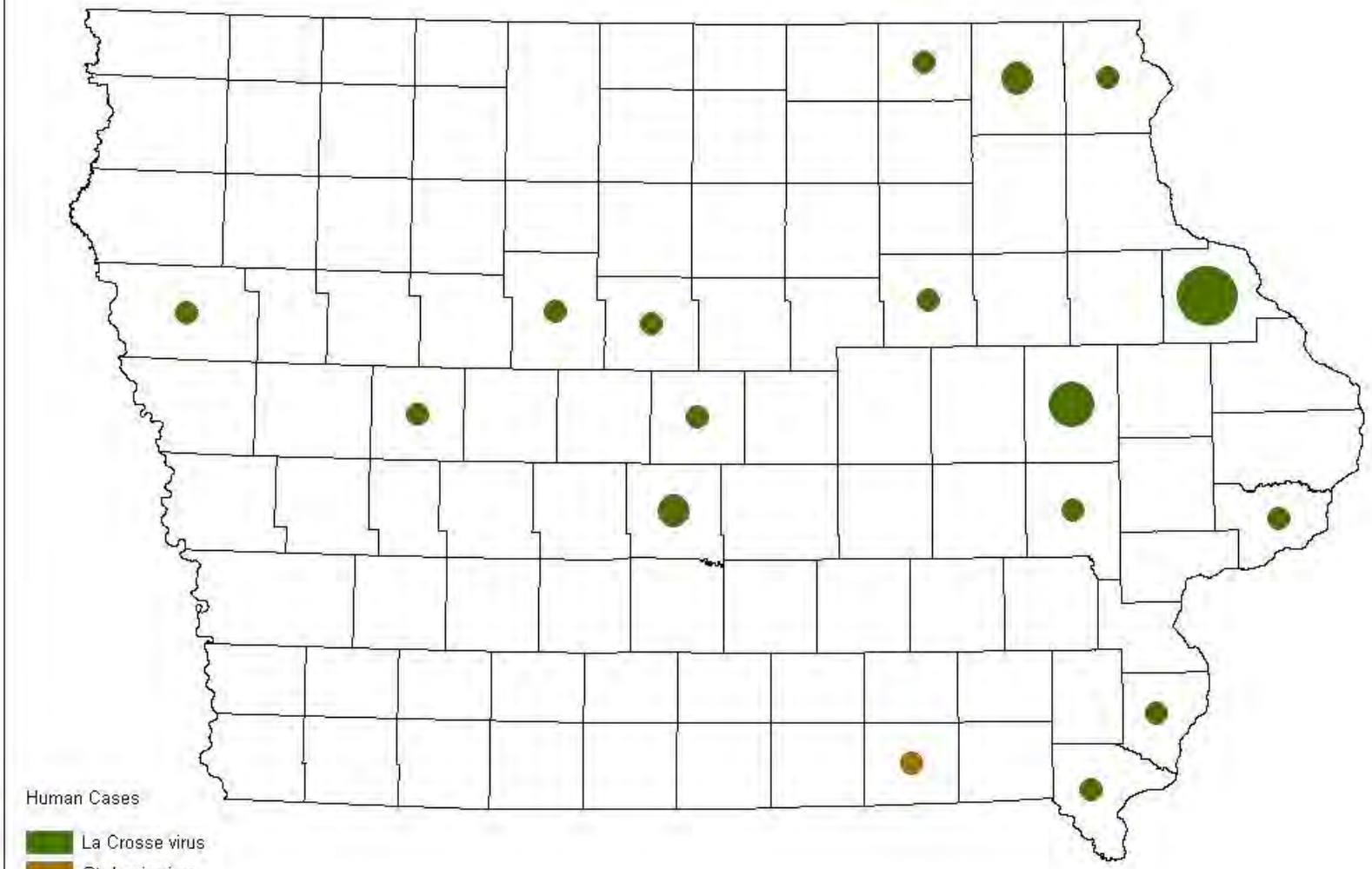
- **Where was this virus discovered?**
  - **La Crosse, Wisconsin**

- **BONUS QUESTION: What Iowa public heath professional grew up in that town?**
  - **Dr. Patty Quinlisk**


Human Arbovirus Cases 1965-1974
Human Cases
La Crosse virus
St. Louis virus
Western equine encephalitis
West Nile virus


Human Arbovirus Cases 1975-1984
Human Cases
La Crosse virus
St. Louis virus
Western equine encephalitis
West Nile virus

Human Arbovirus Cases 1985-1994



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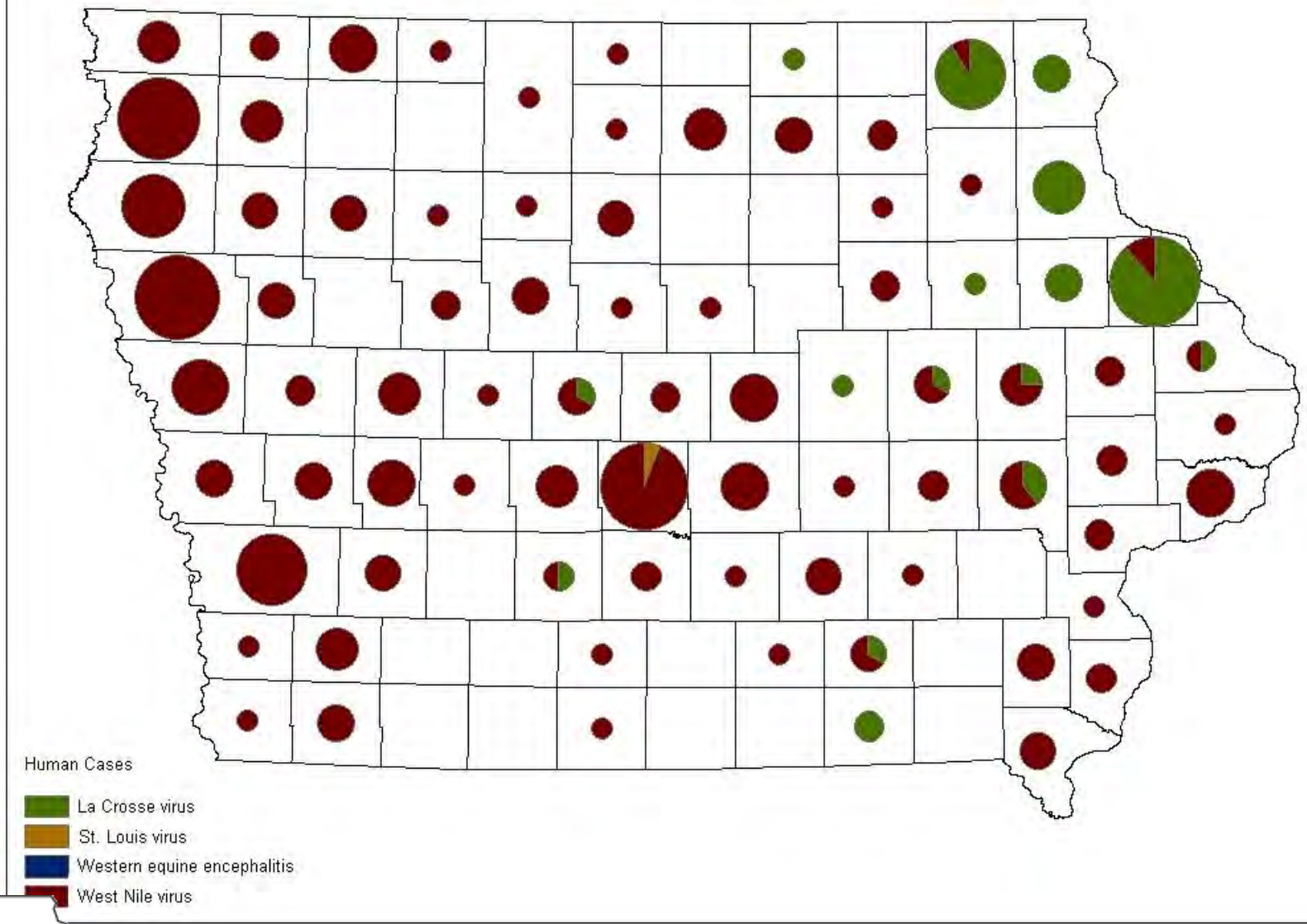
Human Arbovirus Cases 1995-2004



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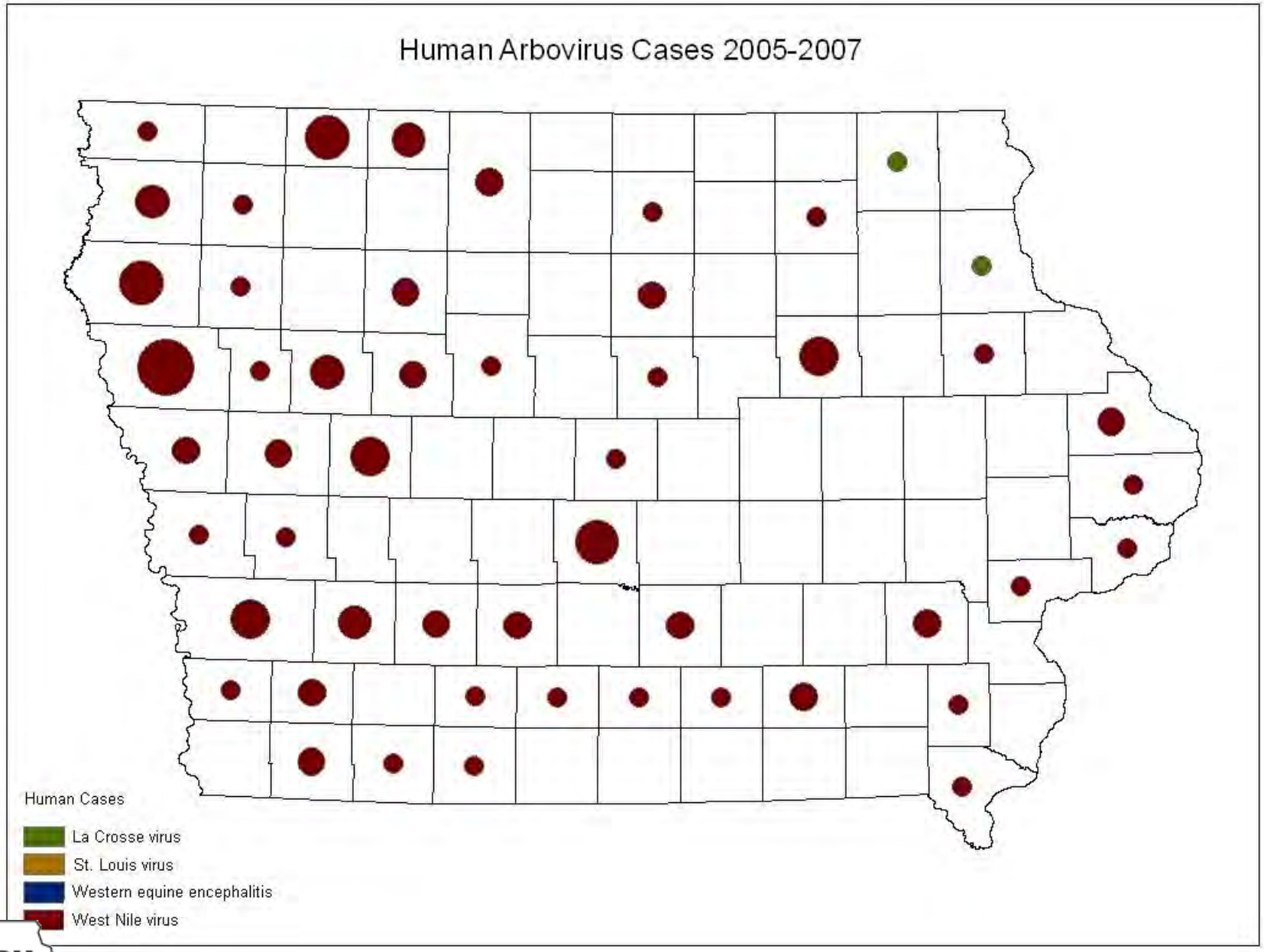

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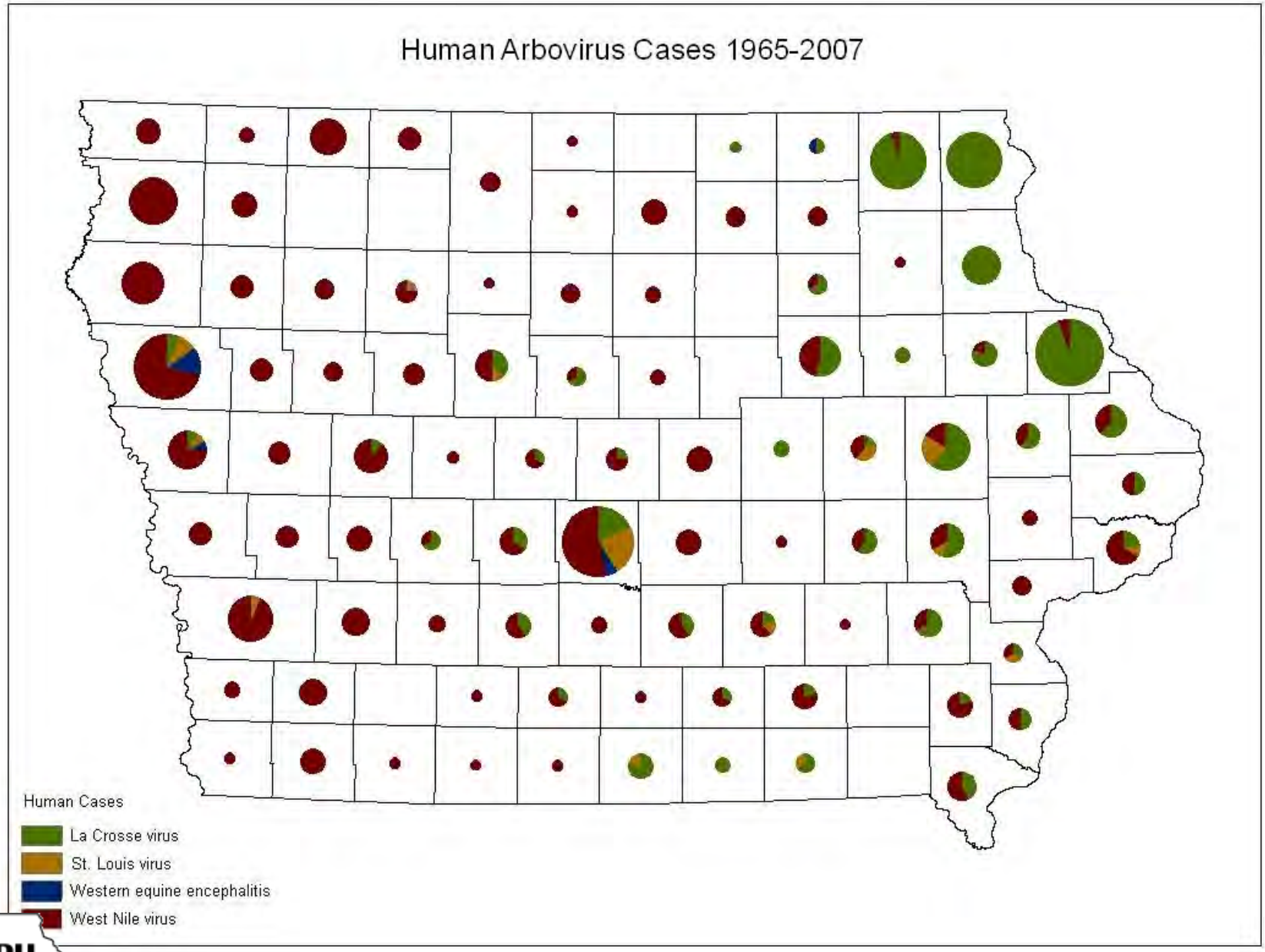

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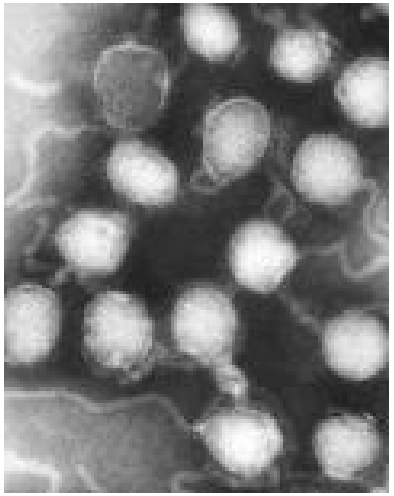
La Crosse Encephalitis

- Discovered in La Crosse, WI in 1963
  - 4-year old Minnesota girl died in La Crosse of acute encephalitis.
- Greatest risk for clinical disease in children <16 years old
  - Cases often un- or misdiagnosed
  - Case-fatality rate: < 1%



- Mosquito vector?
  - *Aedes triseriatus* (tree hole mosquito)
- Aplifier chipmunks and squirrels

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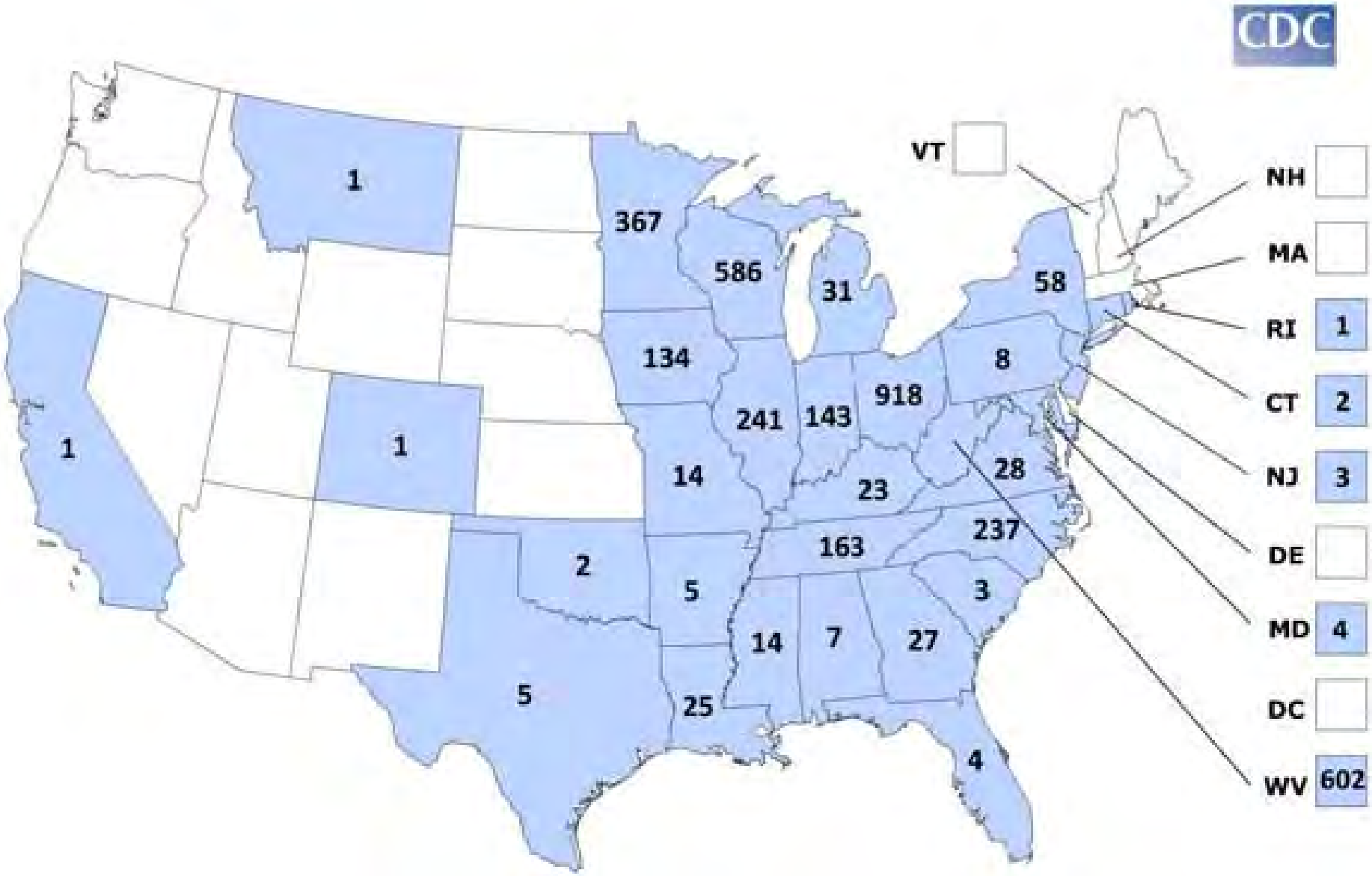
California Serogroup Virus Neuroinvasive Disease Cases* Reported by State, 1964-2010



True or False ?

- Malaria was once very common in Iowa
- Yes
- Over 1100 cases reported in the 1940's alone
- Malaria eliminated from the US in 1951
  - Eliminating wetlands
  - DDT spraying

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Dengue Virus

- **What state is currently seeing locally acquired Dengue infections?**

- **FLORIDA**

Dengue Virus

- Locally acquired dengue cases in Key West
  - 2009 – 22 cases
  - 2010 – 66 cases
  - 2011 – 7 cases
  - 2012 – 4 cases
  - YTD 2013 – 19 cases
- This year cases in additional counties

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Mosquito-related questions?

Name these 3 ticks types commonly found in Iowa ?

- *Dermacentor variabilis* – American Dog tick
  - Most common species in IA

- *Ixodes scapularis* – Blacklegged / Deer tick
  - Most abundant in NE and E Iowa

- *Amblyomma americanum* – Lone Star Tick
  - Most abundant in Southern Iowa

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Tick diseases in Iowa

- **Deer Tick (*Ixodes scapularis*)**
  - **Lyme disease**
  - **Anaplasmosis**

- **American Dog Tick (*Dermacentor variabilis*)**
  - **Rocky Mt. Spotted Fever**
  - **Tularemia**

- **Lone Start Tick (*Amblyomma americanum*)**
  - **Ehrlichiosis**
  - **Tularemia**

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Lyme Disease

- First recognized in 1975
  - Juvenile rheumatoid arthritis outbreak near Lyme, CT
- Cases (27) first reported in Iowa in 1989
- Cases now reported statewide
  - Recently 100-160 cases/year
- Symptoms
  - Usually appear 3-30 days after exposure
  - 70% - 80% of infected persons develop bulls-eye-rash
  - If untreated:
    - 60% develop arthritis, with severe joint pain and swelling
    - 5% develop chronic neurological complaints

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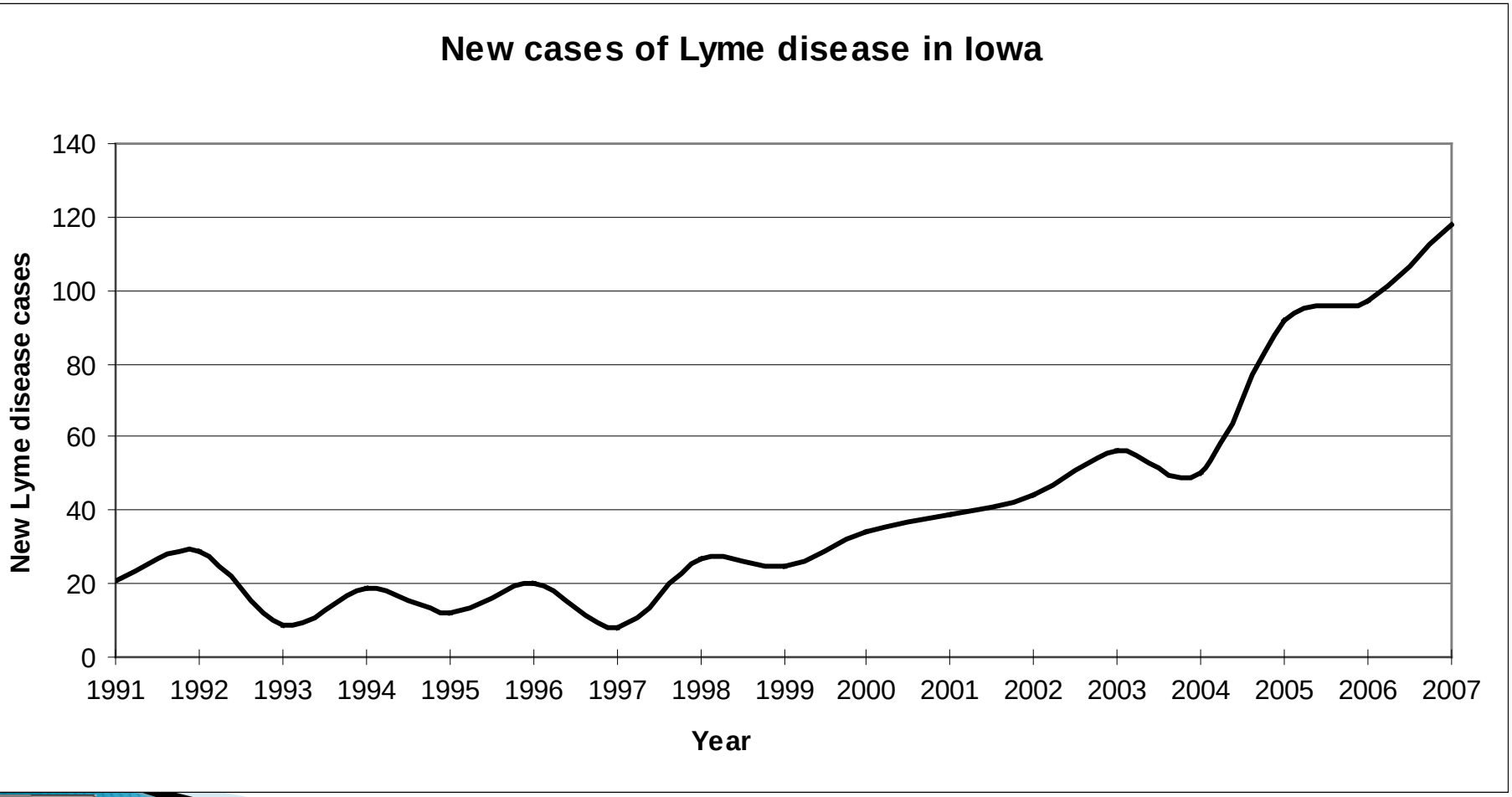
Human Cases of Lyme Disease from 1989 to 2007



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Anaplasmosis

- First recognized in the US in the mid-1990's
- Transmitted by deer tick
- Fever, headache, chills, and muscle aches
  - Rash-very rare
  - 1-2 weeks after exposure
  - <1% case fatality rate
- Cases increasing nationally
  - 248 cases in 2000
  - 1761 cases in 2010

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Rocky Mountain Spotted Fever

- Vector: American Dog Tick
- Symptoms:
  - 2-14 days post tick bite
  - Sudden onset fever and headache
  - Rash 2-5 days after fever
- Can progress to vasculitis, which can cause permanent neurological damage to internal organs

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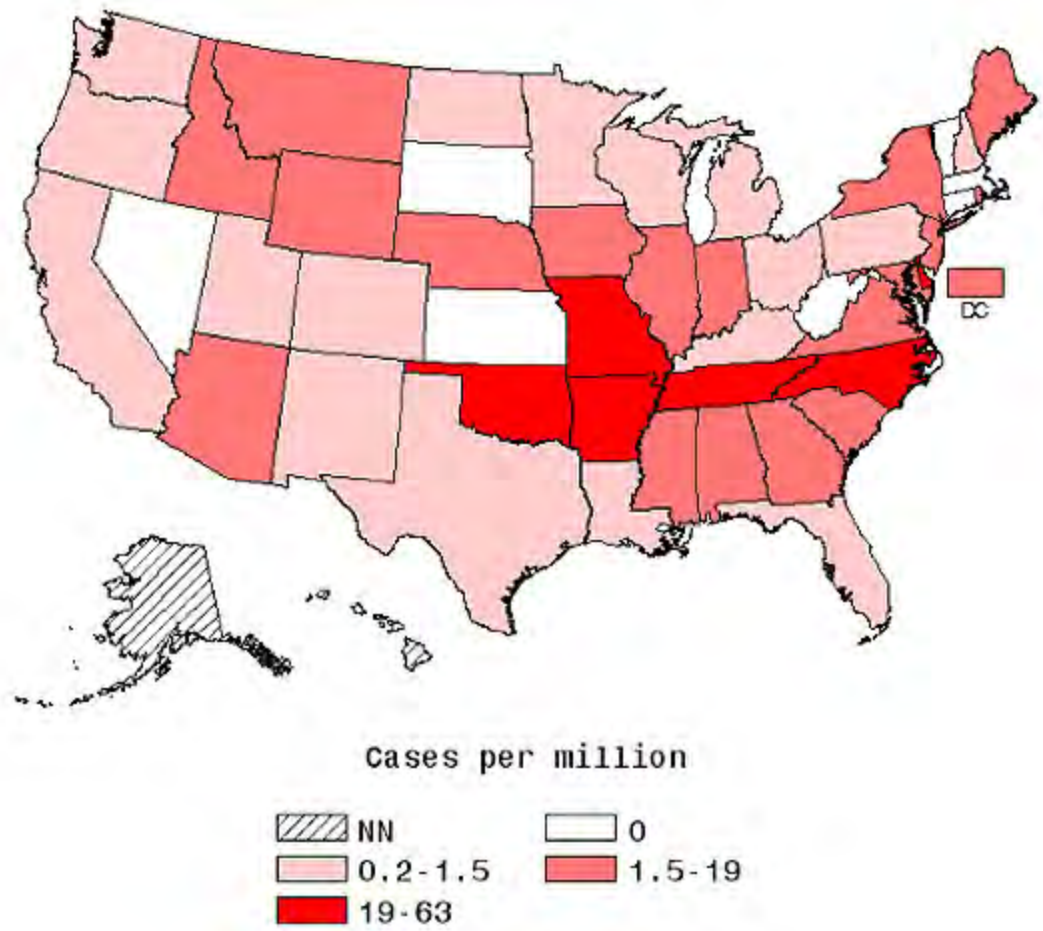
Rocky Mountain Spotted Fever Incidence



Tularemia

- **Caused by bacteria *Francisella tularensis***
- **Transmitted by:**
  - **Both the dog and the lone star tick**
  - **Deer fly bites**
  - **Handling animals**
    - **Hunting or skinning infected rabbits, muskrats, prairie dogs and other rodents**
    - **Bites from infected cats (saliva exposure)**
  - **Inhaling contaminated dust or aerosols**
  - **Contaminated water**
  - **Laboratory exposure – wound or blood cultures**

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Tularemia Illness

- **Illness ranges from mild to life-threatening.**
  - **Symptoms vary depending on how the bacteria enters the body.**
- **Main forms of this disease are:**
  - **Ulceroglandular, Glandular, Oculoglandular, Oropharyngeal, Pneumonic**
  - **All forms are accompanied by fever, which can be as high as 104 °F.**
- **Naturally occurring nationwide (except Hawaii)**

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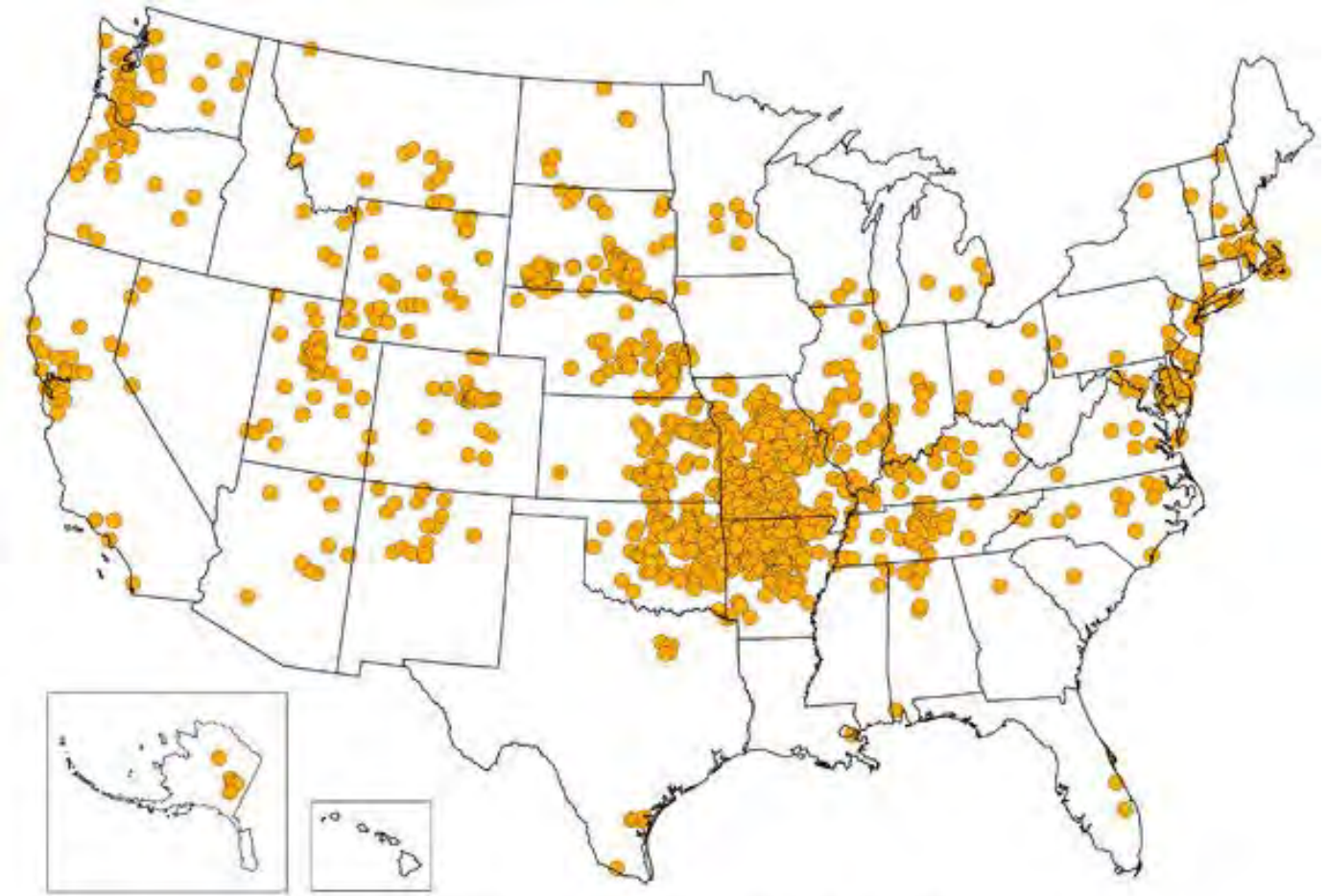
Reported Tularemia Cases 2001-2010



1 dot placed randomly within county of residence for each confirmed case

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Tularemia

- 1-2 cases occur in Iowa yearly
  - Look for a history of skinning animals, tick bites, or spending a lot of time outdoors
  - Usually ulceroglandular or pneumonic forms

- Recommend prophylaxis for laboratory exposures
  - Blood or wound culture

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Erlichiosis

- First recognized in the 1980's
- Caused by 3 species in U.S.
  - *Ehrlichia chaffeensis*- Lone Star Tick
  - *Ehrlichia ewingii* – Lone Star Tick
  - *Ehrlichia muris* – Unidentified tick in MN and WI
- fever, headache, fatigue, and muscle aches
- 1-2 weeks following a tick bite
- 1.8% case fatality if untreated

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What antibiotic can be used to treat all of these diseases?

- Doxycycline

How can Tick disease be prevented?

1. **Do not walk barelegged in tall grass or woods**

2. **Wear a long-sleeved shirt, long pants, and high socks.**
   - **Tuck pants legs into socks.**
   - **Wear light-colored clothing so crawling ticks can be seen more easily.**

3. **Conduct "tick checks" every two to three hours if spending a lot of time outdoors.**
   - **Remove any attached ticks immediately.**

4. **Use tick repellents containing the ingredients DEET for skin applications.**

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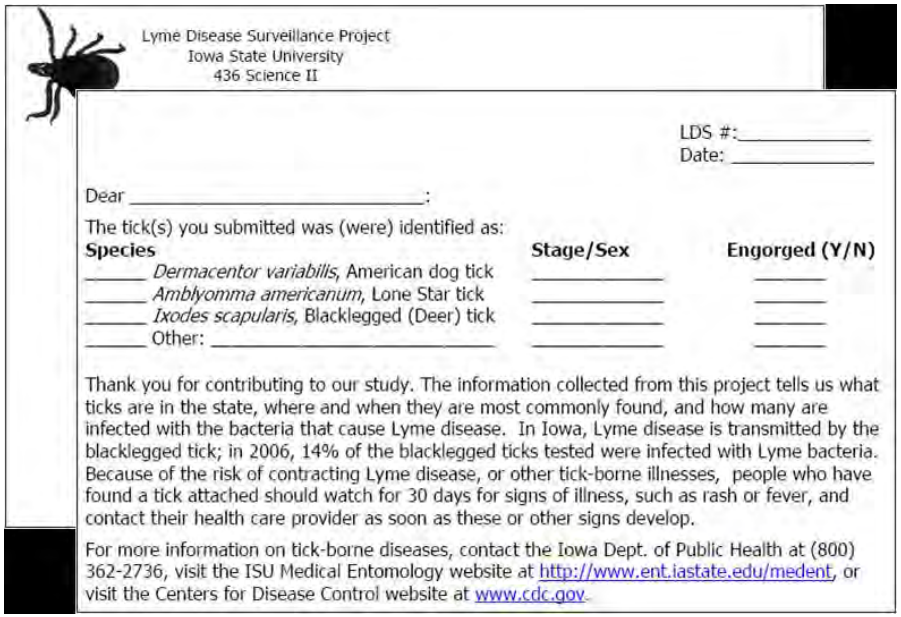
Iowa Tick Surveillance



Lyme Disease Surveillance Project
Iowa State University
436 Science II

LDS #:_____
Date: _____

Dear _____:

The tick(s) you submitted was (were) identified as:

Species	Stage/Sex	Engorged (Y/N)
_____ *Dermacentor variabilis*, American dog tick	_____	_____
_____ *Amblyomma americanum*, Lone Star tick	_____	_____
_____ *Ixodes scapularis*, Blacklegged (Deer) tick	_____	_____
_____ Other: _____	_____	_____

Thank you for contributing to our study. The information collected from this project tells us what ticks are in the state, where and when they are most commonly found, and how many are infected with the bacteria that cause Lyme disease. In Iowa, Lyme disease is transmitted by the blacklegged tick; in 2006, 14% of the blacklegged ticks tested were infected with Lyme bacteria. Because of the risk of contracting Lyme disease, or other tick-borne illnesses, people who have found a tick attached should watch for 30 days for signs of illness, such as rash or fever, and contact their health care provider as soon as these or other signs develop.

For more information on tick-borne diseases, contact the Iowa Dept. of Public Health at (800) 362-2736, visit the ISU Medical Entomology website at http://www.ent.iastate.edu/medent, or visit the Centers for Disease Control website at www.cdc.gov.

- **Operated continuously from 1990 – 2008 and processed more than 8,000 specimens**
- **Goals of the program:**
  - **Identify ticks from public**
  - **Monitor tick population, distribution, and spread**
  - **Test for the presence of *B. burgdorferi***
  - **Provide ticks and tick-borne disease information.**

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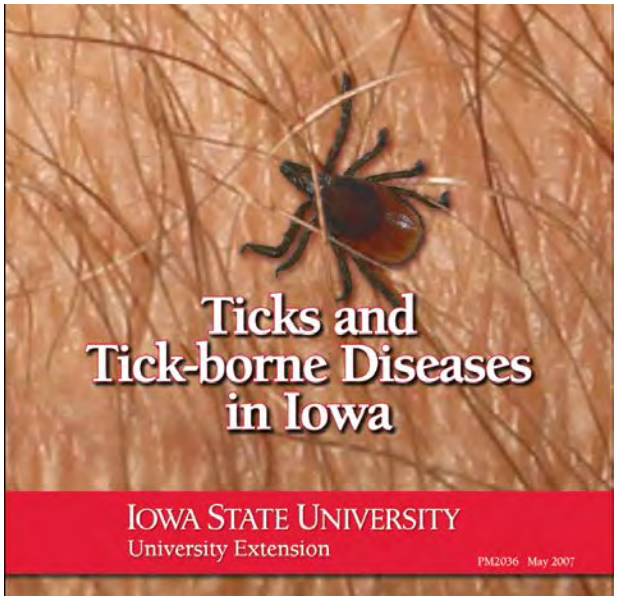
Outreach Information

1 http://www.ent.iastate.edu/medent/ticks_IA

2



Oliver, J, Holscher, K, Hutcheson, HJ, Bartholomay, LC. *Ticks and tick-borne diseases in Iowa*. 6 pp. Iowa State University Extension Publications PM2036.

http://www.extension.iastate.edu/Publications/PM2036.pdf

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Tick-related questions…?

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Rodent Diseases

- Salmonella
- LCMV
- Hantavirus

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Salmonella

- Fecal oral
- Introduced a lot of different ways
  - Rodents just one of many sources
- >600 cases in Iowa last year
- Estimate over a million cases nationally
  - Estimate nearly 20,000 hospitalizations
  - Estimate close to 400 deaths

What does LCMV stand for?

- **Lymphocytic Choriomeningitis Virus**

Lymphocytic Choriomeningitis Virus

- **Source**
  - common house mouse, *Mus musculus* (& other rodents)
  - about 5% of mice in U.S. infected
  - wild and pet rodents
- **Presents as:**
  - aseptic meningitis
  - encephalitis
  - meningoencephalitis
- **Pregnancy-related infection:**
  - congenital hydrocephalus
  - chorioretinitis
  - mental retardation

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LCMV

- **Virus in saliva, urine, & feces**
  - **Infected rodents shed for rest of lives without getting sick**
- **Exposure through broken skin, nose, eyes, or mouth**
  - **Also through rodent bite**
- **Urban serologic studies show prevalence from 2% to 5%**
- **Wild and pet rodent exposures**
  - **Recent outbreak**

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Hantavirus

- Primary reservoir- deer mouse
  - Carriage rate in mice is 10%
- Highly sensitive to UV light
- Viable in mice feces for <2 days
- 50% case fatality rate

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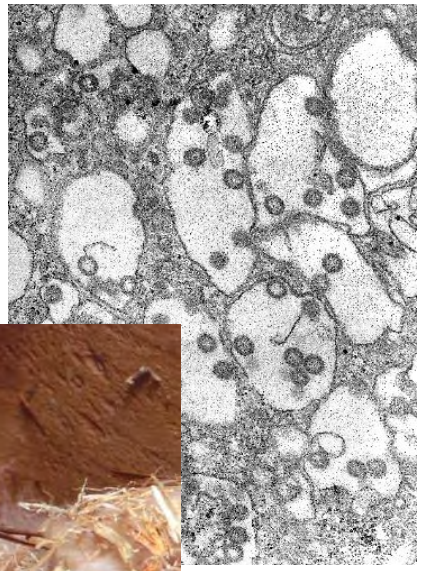
How many cases of Hantavirus have there been in Iowa?

- <10
- 11-50
- 51-100

Hantavirus in Iowa

- 465 cases as of Mid-March 2007 in the U.S.
- Nine cases in Iowa since 1993
  - 1997 1 case
  - 1998 2 case
  - 1999 2 cases
  - 2003 1 case
  - 2008 1 case
  - 2011 1 case
  - 2012 1 case



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Prevention

How to clean up rodent urine and droppings:

- **Wear rubber or plastic gloves**
- **Spray area with a disinfectant or a mixture of bleach and water and soak for 5 minutes**
- **Use a paper towel to wipe up the urine or droppings**
- **Throw the paper towel in the garbage**
- **Mop or sponge the area with a disinfectant or bleach solution**
- **Wash gloved hands with soap and water before taking them off**
- **Wash hands with soap and warm water after taking off your gloves**

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How to clean out cabins, sheds, barns, or other outbuildings

1. Open all doors and windows for 30 minutes
2. Wear rubber or plastic gloves
3. Clean up all rodent urine, droppings, nests, or dead mice or rats as described on last slide
4. Mop floors or spray dirt floors with disinfectant or bleach water
5. Clean countertops, cabinets, and drawers with a disinfectant or a mixture of bleach and water
6. Steam clean, shampoo, or spray upholstered furniture with a detergent, disinfectant, or a mixture of bleach and water
7. Wash any bedding and clothing with laundry detergent in hot water if you see any mouse or rat urine or droppings on them

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Rodent-related questions?

Bat Diseases

Histoplasmosis
Rabies

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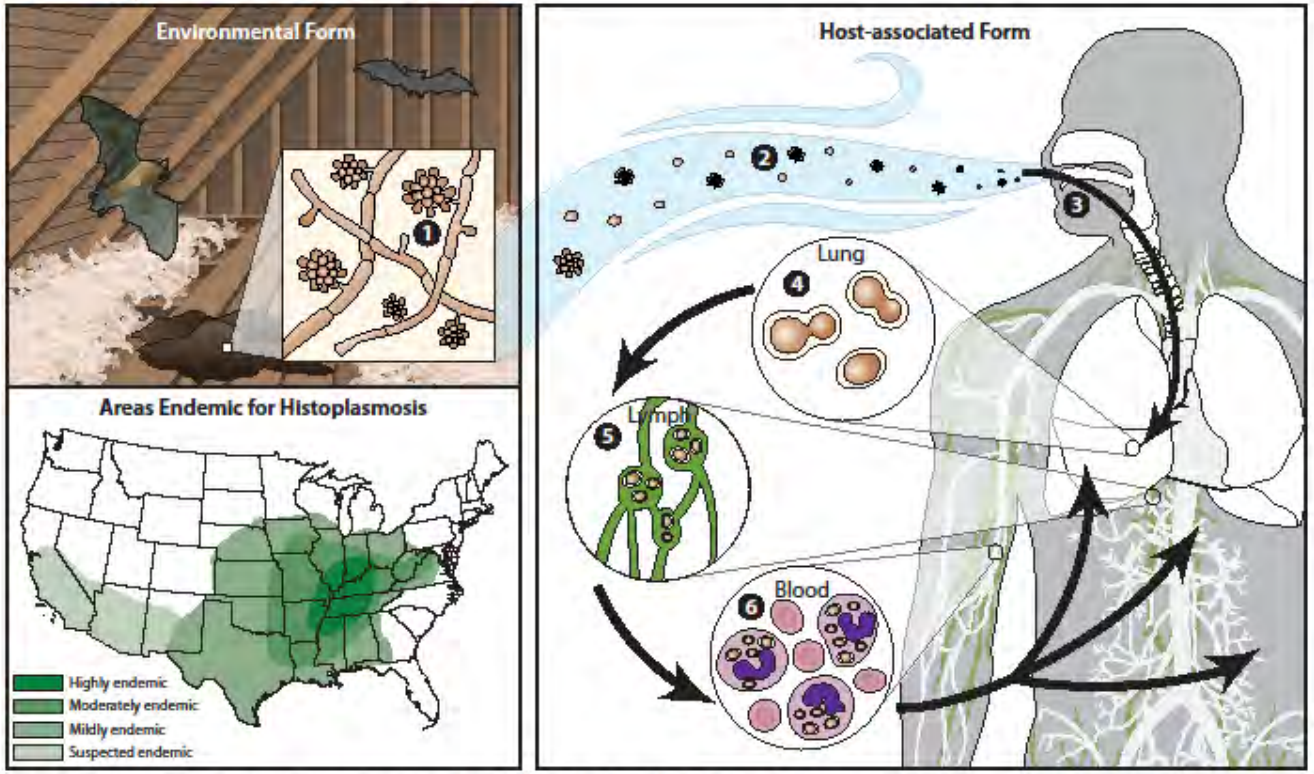
Histoplasmosis

Biology of Histoplasmosis



In the environment, *Histoplasm capsulatum* exists as a mold (1) with aerial hyphae. The hyphae produce macroconidia and microconidia (2) spores that are aerosolized and dispersed. Microconidia are inhaled into the lungs by a susceptible host (3). The warmer temperature inside the host signals a transformation to an oval, budding yeast (4). The yeast are phagocytized by immune cells and transported to regional lymph nodes (5). From there they travel in the blood to other parts of the body (6).

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Histoplasmosis

- fungus *Histoplasma capsulatum*
- lives in the environment
  - Association with bird and bat droppings
- lung infection can occur after inhale spores
  - 3 to 17 days after being exposed to the fungus.
- pneumonia, fever, chest pains, and dry or nonproductive cough
  - Some people may also experience joint pain.
- if untreated, can disseminate to other organs
- accumulations of bird or bat droppings should be cleaned up by professional companies

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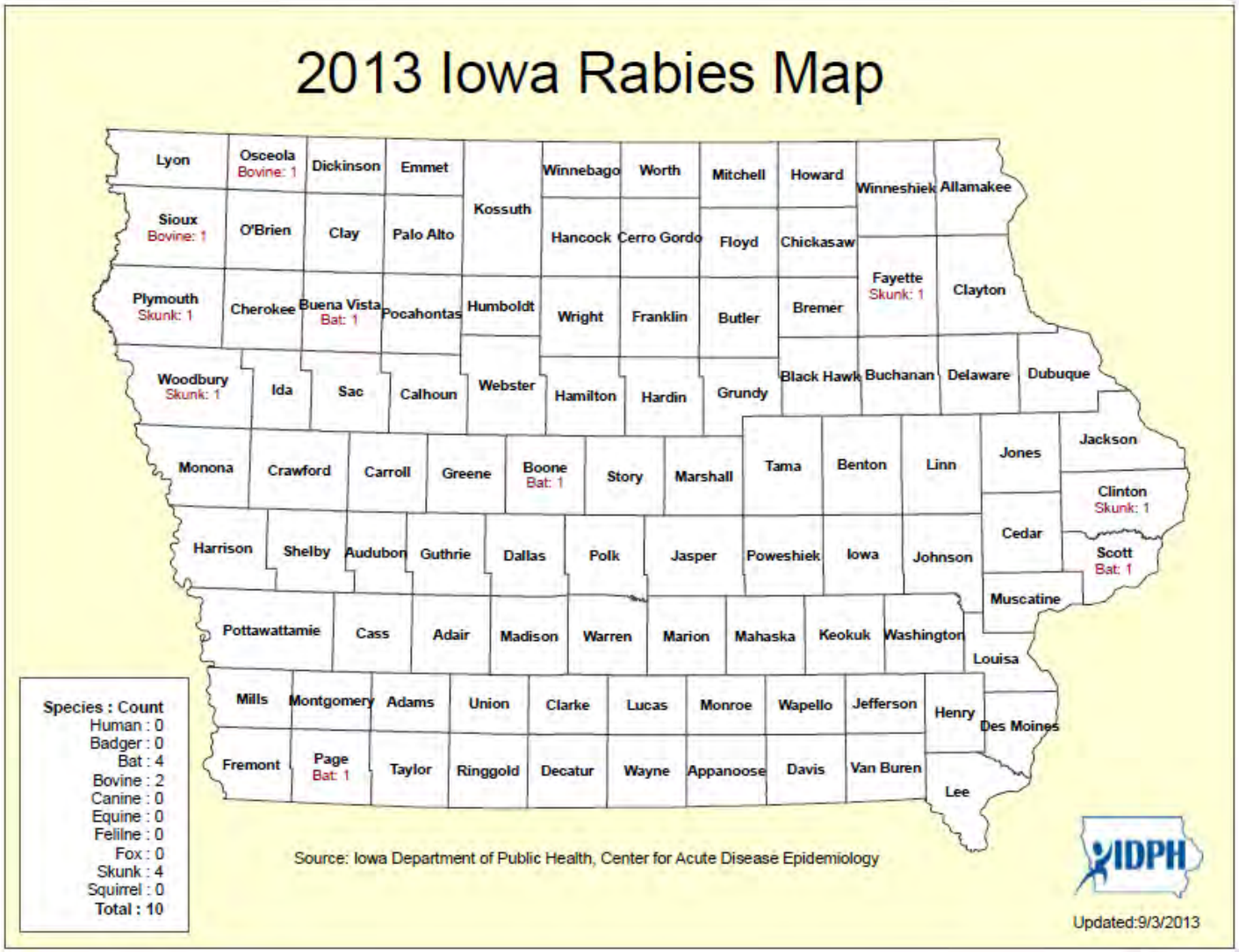
Rabies in Iowa



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Rabies Surveillance Data

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Bat	31	27	47	47	60	28	13	11	11	10	12	17	**314**
Skunk	28	27	38	28	33	13	5	7	13	13	7	9	**221**
Cat	10	7	8	11	5	7	7	9	3	1	3	1	**72**
Cow	10	12	3	10	7	4	0	1	5	1	3	4	**60**
Dog	2	3	6	3	2	2	5	1	2	1	0	0	**27**
Horse	3	2	3	0	1	3	1	0	0	0	0	0	**13**
Fox	1	0	0	1	0	0	0	0	0	1	0	0	**3**
Squirrel	0	0	0	0	0	0	0	0	1	0	0	0	**1**
Badger	0	0	1	0	0	0	0	0	0	0	0	0	**1**
Total	**85**	**78**	**106**	**100**	**108**	**57**	**31**	**29**	**35**	**27**	**25**	**31**	**712**

Species	Positive	Total Tested	% Positive
Skunk	9	34	26.47
Cow	4	96	4.17
Bat	17	520	3.27
Cat	1	361	0.28

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How do you get rabies?

Saliva and Neural Tissue

- Not feces, urine, or blood

Mammals

- Saliva or neural tissue contact through bite or contact to open wound or mucous membrane

Bats (Above Plus)

- Waking up to a bat in your room
- Finding a bat in a room with an unsupervised small child or incapacitated person
- Direct contact (can't say weren't bitten)

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Annual Rabies Report

2010 Iowa Rabies Summary

ANIMAL RABIES IN IOWA:

In 2010, 27 cases of animal rabies were reported in Iowa, which is a slight decrease from 2009 (see the Table 1 below). Rabies was identified most frequently in wildlife species including 13 skunks, 10 bats, and one fox. Two cases were diagnosed in domestic species including 1 cat and 1 dog. One cow also tested positive.

Table 1: Positive Rabies Cases 2001-2010

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Bat	31	27	47	47	60	28	13	11	11	10	285
Skunk	28	27	38	28	33	13	5	7	13	13	205
Cat	10	7	8	11	5	7	7	9	3	1	68
Cow	10	12	3	10	7	4	0	1	5	1	53
Dog	2	3	6	3	2	2	5	1	2	1	27
Horse	3	2	3	0	1	3	1	0	0	0	13
Fox	1	0	0	1	0	0	0	0	0	1	3
Squirrel	0	0	0	0	0	0	0	0	1	0	1
Badger	0	0	1	0	0	0	0	0	0	0	1
Total	85	78	106	100	108	57	31	29	35	27	656

During 2010, 1479 animals in Iowa were tested for rabies and 27 were confirmed positive (1.83%). The percent positive varies greatly by species, see the Table 2 below. It is important to note that this data is greatly influenced by the number of animals tested. Many animals are tested because they exhibit unusual behavior or clinical signs making them more likely to be infected with the rabies virus. For these reasons, the percentages should not be considered representative of the true distribution of disease within the animal population in Iowa.

Table 2: Percent Positive by Species in 2010

Species	Positive	Total Tested	% Positive
Dog	1	322	0.31%
Cow	1	72	1.39%
Cat	1	425	0.24%
Bat	10	444	2.25%
Fox	1	6	16.67%
Skunk	13	27	48.15%

There are two rabies strains that commonly circulate in Iowa (bat and skunk), and many different species can be infected with these strains. In animal samples that are strongly positive for rabies (the strain typing procedure is only effective in samples that are strongly positive as opposed to weakly
Laboratory (SHL) can differentiate the rabies strain that infected the
le to identify the rabies strain in 22 of the 27 positive rabies cases, 14
at strain. Skunk strain rabies was identified in 12 skunks, 1 cat, and 1
ied in 8 bats.

essible on the IDPH website, visit www.idph.state.ia.us/adper/rabies.asp
consultation at 800-362-2736 during business hours or 515-323-4360 after hours

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2011 Iowa Rabies Summary

N IOWA:

animal rabies were reported in Iowa, which is a slight decrease from 2010
Rabies was identified most frequently in wildlife species including 12 bats a
were diagnosed in cats and three cows also tested positive.

Table 1: Positive Rabies Cases 2001-2011

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	To
27	47	47	60	28	13	11	11	10	12	2
27	38	28	33	13	5	7	13	13	7	2
7	8	11	5	7	7	9	3	1	3	
12	3	10	7	4	0	1	5	1	3	
3	6	3	2	2	5	1	2	1	0	
2	3	0	1	3	1	0	0	0	0	
0	0	1	0	0	0	0	0	1	0	
0	0	0	0	0	0	0	1	0	0	
0	1	0	0	0	0	0	0	0	0	
78	106	100	108	57	31	29	35	27	25	6

nimals in Iowa were tested for rabies and 25 were confirmed positive (1.67
varies greatly by species, see the Table 2 below. It is important to note th
fluenced by the number of animals tested. Many animals are tested becau
behavior or clinical signs making them more likely to be infected with the r
ions, the percentages should not be considered representative of the true
e within the animal population in Iowa.

Table 2: Percent Positive by Species in 2011

Species	Positive	Total Tested	% Positive
Cow	3	67	4.48%
Cat	3	369	0.81%
Bat	12	506	2.37%
Skunk	7	22	31.82%

strains that commonly circulate in Iowa (bat and skunk), and many differe
ed with these strains. In animal samples that are strongly positive for rabie
re is only effective in samples that are strongly positive as opposed to wea
lygienic Laboratory (SHL) can differentiate the rabies strain that infected th
. was able to identify the rabies strain in 22 of the 25 positive rabies cases,
d 11 were bat strain. Skunk strain rabies was identified in 7 skunks, 3 cows
ies was identified in 10 bats and 1 cat.

formation is accessible on the IDPH website, visit www.idph.state.ia.us/adper/rabies.asp
24/7 rabies consultation at 800-362-2736 during business hours or 515-323-4360 after hours

2012 Iowa Rabies Summary

ANIMAL RABIES IN IOWA:

In 2012, 31 cases of animal rabies were reported in Iowa, which is a slight increase from 2011 (see the Table 1 below). Rabies was identified most frequently in wildlife species including 17 bats and 9 skunks. Four cases were diagnosed in cows and one cat also tested positive.

Table 1: Positive Rabies Cases 2001-2011

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Bat	31	27	47	47	60	28	13	11	11	10	12	17	314
Skunk	28	27	38	28	33	13	5	7	13	13	7	9	221
Cat	10	7	8	11	5	7	7	9	3	1	3	1	72
Cow	10	12	3	10	7	4	0	1	5	1	3	4	60
Dog	2	3	6	3	2	2	5	1	2	1	0	0	27
Horse	3	2	3	0	1	3	1	0	0	0	0	0	13
Fox	1	0	0	1	0	0	0	0	0	1	0	0	3
Squirrel	0	0	0	0	0	0	0	0	1	0	0	0	1
Badger	0	0	1	0	0	0	0	0	0	0	0	0	1
Total	85	78	106	100	108	57	31	29	35	27	25	31	712

During 2012, 1557 animals in Iowa were tested for rabies and 31 were confirmed positive (1.99%). The percent positive varies greatly by species, see the Table 2 below. It is important to note that this data is greatly influenced by the number of animals tested. Many animals are tested because they have contact with humans or domestic animals and they exhibit unusual behavior or clinical signs making them more likely to be infected with the rabies virus. For these reasons, the percentages should not be considered representative of the true distribution of disease within the animal population in Iowa.

Table 2: Percent Positive by Species in 2012

Species	Positive	Total Tested	% Positive
Skunk	9	34	26.47
Cow	4	96	4.17
Bat	17	520	3.27
Cat	1	361	0.28

There are two rabies strains that commonly circulate in Iowa (bat and skunk), and many different species can be infected with these strains. In animal samples that are strongly positive for rabies, the State Hygienic Laboratory (SHL) can differentiate the rabies strain that infected the animal (the strain typing procedure is only effective in samples that are strongly positive as opposed to weakly positive). In 2012, SHL was able to identify the rabies strain in 23 of the 31 positive rabies cases, 14 were bat strain and 9 were skunk strain. Bat strain rabies was identified in 14 bats. Skunk strain rabies was identified in 8 skunks and 1 cat.

Rabies information is accessible on the IDPH website, visit www.idph.state.ia.us/adper/rabies.asp
IDPH provides 24/7 rabies consultation at 800-362-2736 during business hours or 515-323-4360 after hours

Questions and Comments

Ann Garvey DVM, MPH, MA
State Public Health Veterinarian & Deputy State Epi
Division of ADPER & Environmental Health
Iowa Department of Public Health
515-281-4933
ann.garvey@idph.iowa.gov